4.9 NOISE

The information contained in this section is based on the *SR-22 West Orange County Connection (SR-22/WOCC) Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum* (Parsons Brinckerhoff, December 2000); *Traffic Noise Impact Technical Report and Traffic Noise Impact Technical Report Reduced Build Alternative (Revised) Addendum (December 2002); Traffic Noise Impact Technical Report and Traffic Noise Impact Technical Report Reduced Build Alternative (Revised) Addendum Rossmoor (September 2002); and Traffic Noise Impact Technical Report and Traffic Noise Impact Technical Report Reduced Build Alternative (Revised) Addendum Garden Grove (October 2002),* available under separate cover at the Department and OCTA. These documents describe the traffic noise analyses conducted to simulate conditions that would be expected under the various alternatives, both the methodology and the results. This section includes discussions of impacts and mitigation measures related to traffic noise in the study area for the identified Preferred Alternative, the (Enhanced) Reduced Build Alternative, and other previously reviewed alternatives.

The additional analyses in this section were the result of refined engineering, responding to comments received during the public comment period of the August 2001 DEIR/EIS, and/or additional planning efforts. During the public comment period of the DEIR/EIS, the Department received numerous comments from residents in the Community of Rossmoor as well as in the City of Seal Beach. The residents from these areas were concerned with the potential traffic noise impacts as a result of the implementation of the I-405/605 direct HOV connector. To address this issue, additional analyses were prepared to determine the impacts from the I-405/605 direct HOV connector. In addition, some of the residents along Trask Avenue were concerned with the traffic noise from both Trask Avenue and SR-22. The findings for this analysis as well as discussions of traffic noise impacts to other portions of the SR-22 corridor are discussed in this section. The comments and responses to comments are attached as Appendix A of this FEIS/EIR (Volumes II & III).

The August 2001 DEIR/EIS contained a preliminary traffic noise analysis based on the feasibility and reasonability of noise barriers for the proposed project alternatives. This section of the FEIS/EIR includes a more narrowly defined feasibility and reasonability analysis, and includes noise barriers to address those portions of the (Enhanced) Reduced Build Alternative at the eastern terminus. There are 42 noise barriers that are being considered as part of the (Enhanced) Reduced Build Alternative. 32 noise barriers proposed in the August 2001 DEIR/EIS are no longer being considered in this section of the FEIS/EIR.

Preliminary information on the characteristics of potential noise abatement measures (e.g., physical location, length, and height of noise barriers) is provided in all *Traffic Noise Impact Technical Reports* and is summarized in this section. If pertinent parameters change substantially during the final project design, the preliminary noise abatement design may be changed or eliminated from the final project design. The final design of noise barriers, if included in this project, will be based on the final project design and public involvement processes.

As discussed in sections 2.2 and 4.6, several residential units and businesses would not be displaced or acquired as original proposed in the DEIR/EIS. These include six properties along Martha Ann Drive in Rossmore, six properties along Almond Avenue in Seal Beach, four properties along Enloe Way in Garden Grove, and, two properties along Trask Avenue and eighteen business along Euclid and Trask Avenue in Garden Grove. Additional information can be found in Section 2.2. However, these changes would not impact the predicted noise levels and noise abatement outcome as presented in this section. The specific identification sites are asterisked and noted in tables 4.9-2, 4.9-4, 4.9-11 and 4.9-14.

4.9.1 FEDERAL AND STATE POLICIES AND PROCEDURES

Under NEPA, noise impacts and measures to mitigate adverse impacts must be identified, including impacts for which no or only partial noise abatement/mitigation is possible. Under FHWA's traffic noise abatement requirements, traffic noise impacts must be considered for abatement when the predicted noise levels would "approach or exceed" the agency's noise abatement criteria (NAC) (Table 4.9-1) or when the predicted noise levels would substantially exceed existing noise levels and it is both reasonable

and feasible to provide noise abatement. The representative noise-sensitive land uses used in the SR-22/WOCC noise analyses are classified as activity categories B, C, and E.

Table 4.9-1
FHWA NOISE ABATEMENT CRITERIA (NAC)

Activity Category	Leq(h) for Noisiest Traffic Hour (dBA)	Description of Activity
A	57 (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in Categories A or B.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

The interior noise levels (activity) apply to:
(1)Indoor activities for those parcels where no exterior noise-sensitive land uses or activities have been identified, and
(2)Those situations where the exterior activities are either remote from the highway or shielded in some manner so that the exterior activities will not be affected by the noise, but the interior activities will.
Note: Leq(h) is the one-hour energy equivalent sound level.
Source: FHWA, 1994

Under CEQA, a substantial noise increase may result in a significant adverse environmental effect and, if it does, it must be mitigated or identified as a noise impact for which it is likely that no or only partial abatement measures are available. Specific economic, social, environmental, legal and technological conditions may make additional noise abatement/mitigation measures infeasible. For the purpose of this document, the terms abatement and mitigation are used interchangeably. However, according to the Department's Traffic Noise Analysis Protocol (1998), "if a project will have a significant adverse environmental effect due to noise, the proposed noise abatement measure is called *noise mitigation*. Otherwise, it should be referred to as *noise abatement*."
The Department defines traffic noise impacts as:

- When there is a substantial noise increase, i.e., when the predicted noise levels with the project would exceed existing noise levels by 12 dBA or more, Leq(h)
- When predicted noise levels approach (come within one dBA) or exceed the NAC

If traffic noise impacts are predicted, the Department requires that noise abatement measures be evaluated and considered. These measures would usually include noise barriers constructed within the highway right-of-way. If, as a result of a proposed freeway project, noise levels in classrooms of public or private elementary or secondary schools exceed 52 dBA Leq (h), the Department shall provide abatement to reduce classroom noise equal to or below the criteria in accordance with Streets and Highways Code, Section 216. If the classroom noise exceeds the criteria before and after the freeway project, the Department shall provide noise abatement to reduce classroom noise to pre-project noise levels.

4.9.2 PREDICTED FUTURE NOISE LEVEL

A. PREFERRED ALTERNATIVE/(ENHANCED) REDUCED BUILD ALTERNATIVE

Under the (Enhanced) Reduced Build Alternative, traffic lanes would be moved nearer to noise-sensitive receivers and the noise levels would change. Table 4.9-2 shows the predicted noise levels and the noise increases/decreases (where applicable) at each of the receivers. As shown on this table, 71 of the 75 sites are predicted to approach or exceed the applicable NAC.

Table 4.9-2
EXISTING AND PREDICTED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
1-A	68	69	+1	Approaches/exceeds NAC (category B – 67 dBA)
1-G	63	64	+1	None
1-K	60	60	+0	None
3	63	66	+3	Approaches/exceeds NAC (category B – 67 dBA)
Blue Bell Park	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
B	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Almond Park	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
5	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-A*	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-B	66	76	+ 10 [a]	Approaches/exceeds NAC (category B – 67 dBA)
6-a	74	74	+0	Approaches/exceeds NAC (category B – 67 dBA)
6-e	73	74	+1	Approaches/exceeds NAC (category B – 67 dBA)
6-j	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
7	73	74	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
C	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
8	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
9	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
11	71	72	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
12	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
M-1	65	68	+3	Approaches/exceeds NAC (category B – 67 dBA)
M-11	64	65	+1	None
13	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
14	73	75	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
D	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15-A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
16	68	72	+ 4	Approaches/exceeds NAC (category B – 67 dBA)
16-A	75	78	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
16-B	73	73	0	Approaches/exceeds NAC (category B – 67 dBA)
17	66	71	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
18*	70	76	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
Bolsa Grande High School Playground	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
19	68	74	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
20	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
E	71	73	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Excelsior Elem. School Playground	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21-A	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
22	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
22-A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
22-B*	70	70	0	Approaches/exceeds NAC (category B – 67 dBA)
23	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
23-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
24	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
25	67	70	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
F	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)

* These sites had properties that were either proposed for displacements or acquisitions during the DEIR/EIS. However, the displacements or acquisitions are no longer applicable at these sites.

Table 4.9-2 (continued)
EXISTING AND PREDICTED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
Eisenhower Elem. School Playground	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
26	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27-A	73	76	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
27-B	72	75	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
G	63	66	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
G-A	64	67	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
27-I	65	67	+2	Approaches/exceeds NAC (category B – 67 dBA)
40-W	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
28	65	73	+ 8 [b]	Approaches/exceeds NAC (category B – 67 dBA)
28-A	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
28-B	65	69	+ 4	Approaches/exceeds NAC (category B – 67 dBA)
28-C	61	68	+ 7 [b]	Approaches/exceeds NAC (category B – 67 dBA)
29	67	68	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
29-B	63	64	+ 1	None
29-c	65	67	+2	Approaches/exceeds NAC (category B – 67 dBA)
29-M	63	66	+3	Approaches/exceeds NAC (category B – 67 dBA)
29-M1	65	66	+1	Approaches/exceeds NAC (category B – 67 dBA)
29-C	67	72	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
29-D	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
30-A	68	70	+2	Approaches/exceeds NAC (category B – 67 dBA)
31	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
H-6	70	72	+2	Approaches/exceeds NAC (category B – 67 dBA)
H-26	74	75	+1	Approaches/exceeds NAC (category B – 67 dBA)
H-29	70	71	+1	Approaches/exceeds NAC (category B – 67 dBA)
31-B	73	75	+2	Approaches/exceeds NAC (category B – 67 dBA)
32-2	66	69	+3	Approaches/exceeds NAC (category B – 67 dBA)

a The future predicted noise levels would be much higher because the existing non-state wall that shields receiver would be removed as part of the (Enhanced) Reduced Build Alternative.
b The future predicted noise levels would be much higher because buildings and noise barriers that shield receiver would be removed as part of the (Enhanced) Reduced Build Alternative.

The preliminary analysis of the interior noise levels at the interiors of school buildings nearest to the (Enhanced) Reduced Build Alternative improvements is summarized in Table 4.9-3. This table shows that the school interior NAC would be exceeded at three out of four schools within the (Enhanced) Reduced Build Alternative study area, Bolsa Grande High School, Jordan Intermediate School, and Excelsior Elementary School. At both Jordan Intermediate School and Excelsior Elementary School, the NAC is exceeded in the existing condition also.

Table 4.9-3

EXISTING AND PREDICTED FUTURE NOISE LEVELS AT SCHOOL BUILDING INTERIORS (ENHANCED) REDUCED BUILD ALTERNATIVE

School	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA		Predicted Noise Level (highest noise hour) in Leq(h), dBA		Impact Type (Note: Approaches means comes within one dBA of NAC)
	Outside	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	Outside	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	
Bolsa Grande High School Bldg. Interior (not air-conditioned)	60	50	65	55	Approaches/exceeds NAC (category E – 52 dBA)
Jordan Intermed. School Bldg. Interior (not air-conditioned)	69	59	71	61	Approaches/exceeds NAC (category E – 52 dBA)
Fairhaven Elem. School Bldg. Interior (air-conditioned)	69	49	70	50	None
Excelsior Elem. School Bldg. Interior (not air-conditioned)	66	56	68	58	Approaches/exceeds NAC (category E – 52 dBA)

ROSSMOOR STUDY AREA
(SEAL BEACH BOULEVARD AT SR-22 TO KATELLA AVENUE AT I-605)

The predicted future build traffic noise levels include both the SR-22 mainline roadway and the elevated I-405 and I-605 HOV Connector roadways. The future traffic noise levels for both the SR-22 mainline and HOV Connector, modeled at 30 sites, are expected to be in the range of no change to 4 dBA higher than the existing worst-case traffic noise levels (Table 4.9-4). The Department/FHWA NAC is predicted to be approached or exceeded at 15 sites where noise abatement measures will be further considered.

Traffic noise predictions were modeled for the three school buildings closest to the project alignment. At each of these schools the modeled worst-hour traffic noise levels outside the school building was found not to approach the exterior NAC of 67 dBA. The modeled noise levels outside the school building were adjusted to predict the interior noise levels using the FHWA building noise reduction values for typical building structures.

The predicted interior noise levels are presented in Table 4.9-5. It was assumed that windows would be open in school buildings that are not air-conditioned, providing a 10 dBA noise reduction between outside and inside the building. For school buildings that are air-conditioned, it was assumed that windows would be closed, providing a building noise reduction of 20 dBA. Based on the analyses, the estimated interior noise levels at these three schools would not approach or exceed the Department/FHWA interior NAC of 52 dBA.

Table 4.9-4
EXISTING AND PREDICTED FUTURE NOISE LEVELS
ROSSMOOR STUDY AREA

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
Lee Elementary School	58	59	+1	None
1-15A	67	68	+1	Approaches/exceeds NAC (category B – 67 dBA)
1-15B	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
1-24	67	68	+1	Approaches/exceeds NAC (category B – 67 dBA)
1A-15A	62	64	+2	None
1A-15B	61	63	+2	None
Weaver Elementary School	57	59	+2	None
1B-15A*	60	64	+4	None
1B-15B*	59	61	+2	None
1M-A	60	64	+4	None
1M-B	59	62	+3	None
1MA-A	61	64	+3	None
1MA-B	59	62	+3	None
2-15A	62	64	+2	None
2-15B	59	61	+2	None
2M	62	64	+2	None
2M-A	66	68	+2	Approaches/exceeds NAC (category B – 67 dBA)
2-24	68	70	+2	Approaches/exceeds NAC (category B – 67 dBA)
2-24MB	67	69	+2	Approaches/exceeds NAC (category B – 67 dBA)
2A-15A	70	72	+2	Approaches/exceeds NAC (category B – 67 dBA)
2A-15B	63	65	+2	None
2AM-A	63	66	+3	Approaches/exceeds NAC (category B – 67 dBA)
2AM-B	66	68	+2	Approaches/exceeds NAC (category B – 67 dBA)
Francis Elementary School	63	64	+1	None
2B-15A	67	69	+1	Approaches/exceeds NAC (category B – 67 dBA)
2B-15B	64	66	+2	Approaches/exceeds NAC (category B – 67 dBA)
3A-15A	68	69	+1	Approaches/exceeds NAC (category B – 67 dBA)
3-15A	68	70	+2	Approaches/exceeds NAC (category B – 67 dBA)
3-15B	68	70	+1	Approaches/exceeds NAC (category B – 67 dBA)
3-24	71	71	+0	Approaches/exceeds NAC (category B – 67 dBA)

* These sites had properties that were either proposed for displacements or acquisitions during the DEIR/EIS. However, the displacements or acquisitions are no longer applicable at these sites.

Table 4.9-5
EXISTING AND PREDICTED WORST-HOUR FUTURE NOISE LEVELS
AT SCHOOL BUILDING INTERIORS
ROSSMOOR STUDY AREA

School	Existing Modeled Noise Level, dBA		Predicted Future Noise Level, dBA		Impact Type* (S, A/E, CR, or None)
	Outside	Inside	Outside	Inside	
Lee Elementary School Building	58	38	59	39	None
Weaver Elementary School Building	56	36	58	38	None
Francis Elementary School Building	62	42	64	44	None

**Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC, CR = Classroom Noise*

GARDEN GROVE STUDY AREA
(MAGNOLIA STREET TO NEWHOPE STREET)

The predicted future noise levels, which includes the traffic noise for both the SR-22 freeway and Trask Avenue, are expected to be in the range of no change to 4 dBA higher than the existing worst-hour traffic noise levels (Table 4.9-6). The future traffic noise levels for both the SR-22 freeway and Trask Avenue traffic is predicted to approach or exceed the Department/FHWA NAC at 18 of the 19 modeling sites.

Traffic noise predictions were modeled for the three school buildings closest to the project alignment. At the each of these schools, the modeled future worst-hour traffic noise levels outside the school building closest to the SR-22 alignment was found to approach or exceed the exterior NAC of 67 dBA. The modeled noise levels outside the school buildings were adjusted to predict the interior noise levels using the FHWA building noise reduction values for typical building structures.

To predict the interior noise level at these school classrooms, the measured building attenuation is subtracted from the predicted (modeled) outside traffic noise levels contributed by SR-22 and Trask Avenue. Interior noise levels were calculated with either windows closed for air-conditioned rooms and windows opened for non air-conditioned rooms. Based on the analyses, the estimated interior noise levels at classrooms without air conditioning at two schools would approach or exceed the Department/FHWA interior NAC of 52 dBA.

Table 4.9-6
EXISTING AND PREDICTED FUTURE NOISE LEVELS
GARDEN GROVE STUDY AREA

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), Dba	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
18-A	74	75	+1	Approaches/exceeds NAC (category C – 72 dBA)
T-1	73	74	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-2M	74	77	+3	Approaches/exceeds NAC (category C – 72 dBA)
T-2	69	71	+2	Approaches/exceeds NAC (category B – 67 dBA)
T-3	69	70	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-4	71	72	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-24A	71	72	+1	Approaches/exceeds NAC (category B – 67 dBA)
19-A	74	74	+0	Approaches/exceeds NAC (category C – 72 dBA)
T-5M	74	75	+1	Approaches/exceeds NAC (category C – 72 dBA)
T-5	60	62	+2	None
T-6M	74	74	+0	Approaches/exceeds NAC (category C – 72 dBA)
T-6	70	71	+1	Approaches/exceeds NAC (category B – 67 dBA)
20-A	70	74	+4	Approaches/exceeds NAC (category C – 72 dBA)
T-7	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-8	72	73	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-24B	68	70	+2	Approaches/exceeds NAC (category B – 67 dBA)
T-9	67	69	+2	Approaches/exceeds NAC (category B – 67 dBA)
T-10	66	67	+1	Approaches/exceeds NAC (category B – 67 dBA)
T-11	71	72	+1	Approaches/exceeds NAC (category B – 67 dBA)

Table 4.9-7
EXISTING AND PREDICTED WORST-HOUR FUTURE NOISE LEVELS
AT SCHOOL BUILDING INTERIORS
GARDEN GROVE STUDY AREA

School	Existing Modeled Noise Level, dBA		Predicted Future Noise Level, dBA		Impact Type* (S, A/E, CR, or None)
	Outside	Inside	Outside	Inside	
Sunnyside Elementary School Building – Closest air-conditioned building to Trask Ave. (Classroom 40)	66	43	67	44	None
Sunnyside Elementary School Building – Closest building without air-conditioning to Trask Ave. (Classroom 25)	63	53	64	54	A/E
Mitchell Elementary School Building - Closest building without air-conditioning to Trask Ave. (Classroom 4)	70	62	70	62	A/E

**Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC, CR = Classroom Noise*

B. OTHER ALTERNATIVES

1. NO BUILD ALTERNATIVE

No construction is proposed under the No Build Alternative other than for those future transportation projects that have been previously approved and funded for implementation by the year 2020. These are assumed to be addressed in other environmental documents. Thus, future noise levels under this alternative would be similar to the existing conditions modeled for the highest noise hour. Table 3.9-1 (Existing Noise Levels) in Section 3.9 indicates that 62 of the 78 noise-sensitive receivers identified (not including indoor noise levels at schools) approach or exceed the NAC for the applicable activity category under the existing condition. That is, they have a highest-noise-hour noise level of 66 Leq(h) dBA or more for activity category B, or 71 Leq(h) dBA or more for activity category C, or 51 Leq(h) dBA or more for category E.

2. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would not result in changes in traffic patterns that would place travel lanes closer to noise-sensitive receivers; thus, future noise levels under this alternative would be similar to the existing conditions modeled for the highest noise hour. Table 3.9-1, Existing Noise Levels, in Section 3.9 indicates that 62 of the 78 noise-sensitive receivers identified (not including indoor noise levels at schools) approach or exceed the NAC for the applicable activity category under the existing condition. That is, they have a highest-noise-hour noise level of 66 Leq(h) dBA or more for activity category B or 71 Leq(h) dBA or more for activity category C, or 51 Leq(h) dBA for category E.

3. FULL BUILD ALTERNATIVE

The predicted future noise levels for noise impact areas of the Full Build Alternative are described within Section 4.9.2.A for (Enhanced) Reduced Build Alternative, including the Rossmoor and Garden Grove study areas. The predicted noise levels for Pacific Electric Arterial, SR-22/SR-55 Interchange, and City Drive where the (Enhanced) Reduced Build and Full Build Alternatives do not share common project features can be found in Tables 4.9-8 and 4.9-11. Table 4.9-8 shows the predicted noise levels and the noise increases/decreases (where applicable) at each of the receivers. As shown on this table, 9 of the 11 remaining sites modeled for the Full Build Alternative are predicted to approach or exceed the applicable NAC. (Also, see the discussion of interior noise at school, below.) At three sites,

Site 33 (Willowick Royal Mobile Home Park, Santa Ana), Site 33-A (Boyer Avenue, Santa Ana), and the Willowick Municipal Golf Course, there would be a substantial increase (12 dBA or more). Under California Environmental Quality Act, a substantial noise increase may result in a significant adverse environmental effect and if so, must be mitigated. In this case, noise abatements are proposed in Section 4.9.4.2.B.3 to abate noise at the above three sites.

Table 4.9-8
EXISTING AND PREDICTED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase Or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
G	63	73	+ 10 [a]	Approaches/exceeds NAC (category B – 67 dBA)
J	65	65	0	None
31-A	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
I	70	70	0	Approaches/exceeds NAC (category B – 67 dBA)
32	67	67	0	Approaches/exceeds NAC (category B – 67 dBA)
32-A	68	68	0	Approaches/exceeds NAC (category B – 67 dBA)
33	51	75	+ 24 [b]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)
33-A	51	70	+ 19 [b]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)
Willowick Muni. Golf Course	51	70	+ 19 [b]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)
Spurgeon Intermed. School Playground	56	65	+ 9 [b]	None
34	56	66	+ 10 [b]	Approaches/exceeds NAC (category B – 67 dBA)

[a] The future predicted noise levels would be much higher because buildings that shield receiver would be removed as part of the Full Build Alternative.

[b] The future predicted noise levels would be much higher because there would be a new arterial (new noise source) within a currently vacant right-of-way.

In addition to the schools studied under (Enhanced) Reduced Build Alternative including the Rossmoor and Garden Grove study areas, the preliminary analysis of the interior noise levels at the interiors of school buildings nearest to the Full Build Alternative improvements is summarized in Table 4.9-9. This table shows that the school interior NAC would be not exceeded at Spurgeon Intermediate School.

Table 4.9-9
EXISTING AND PREDICTED FUTURE NOISE LEVELS AT SCHOOL BUILDING INTERIORS
FULL BUILD ALTERNATIVE

School	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA		Predicted Noise Level (highest noise hour) in Leq(h), dBA		Impact Type (Note: Approaches means comes within one dBA of NAC)
	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	
Spurgeon Intermed. School Bldg. Interior (air-conditioned)	< 63	< 43	63	43	None

- Noise level at building exterior.

4.9.3 CONSTRUCTION NOISE

Construction noise represents a short-term impact on the noise environment. The duration and level of construction noise are variable, depending upon the following phases of activity:

- Ground-clearing, demolition, and removal of existing structures, trees, rocks and soil
- Excavation
- Placement of foundations and roadbeds
- Erection of structures, including bridges and retaining walls
- Finishing, including filling, grading, paving, landscaping and cleanup operations

Typically, the first two phases (ground clearing and excavation) generate the highest noise levels. Noise generated by construction equipment, including trucks, graders, bulldozers, concrete mixers and portable generators, can reach levels in the range of 67 to 98 dBA at 15 meters (50 feet). The EPA's Noise Control Program (40 CFR 204) regulates some construction equipment noise emissions. Presently, air compressors are the only equipment under regulation.

A. PREFERRED ALTERNATIVE/(ENHANCED) REDUCED BUILD ALTERNATIVE

Noise levels for equipment that might be used for the excavation and construction of the (Enhanced) Reduced Build Alternative are listed in Table 4.9-10. The levels listed are at 15 meters (50 feet) from the noise source. For each doubling of distance, the noise decreases by approximately six dBA. So at 30 meters (100 feet), the noise levels would be about six dBA less than shown. Similarly, at 60 meters (200 feet), the noise levels would be 12 dBA less than shown. Intervening structures or topography can act as a sound barrier and also reduce noise levels further.

Table 4.9-10
CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum Level, dBA At 15 meters (50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82

Source: Federal Transit Administration, 1995

B. OTHER ALTERNATIVES

1. NO BUILD ALTERNATIVE

No construction is proposed under the No Build Alternative other than for those future transportation projects that have been previously approved and funded for implementation by the year 2020. These are assumed to be addressed in other environmental documents. Thus, there would not be additional construction noise impacts.

2. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would largely consist of operational and system improvements, with only minor construction. Thus, there would be no construction noise impacts.

3. FULL BUILD ALTERNATIVE

Noise levels for equipment that might be used for the excavation and construction for the Full Build Alternative are listed in Table 4.9-10, Construction Equipment Noise Levels.

4.9.4 NOISE ABATEMENT/MITIGATION

4.9.4.1 Summary of Preliminary Noise Abatement Analysis

Under the Department's *Traffic Noise Analysis Protocol* (October 1998), noise abatement measures must be considered when traffic noise impacts have been identified. Preliminary noise abatement design includes acoustical considerations such as noise barrier heights, lengths and location. A minimum of a five-dBA reduction in noise levels must be achieved at the impacted receiver for the proposed noise abatement measure to be considered feasible. Different noise barrier heights are considered when assessing feasibility. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may also be affected by physical constraints, such as topography, driveways, ramps, cross streets, other noise sources in the area, and safety considerations. The final noise abatement analysis will be conducted at final design.

Whether a noise barrier wall is *reasonable* is a more complicated determination that includes the following considerations:

1. Cost of the abatement
2. Absolute noise levels
3. Change in noise levels
4. Noise abatement benefits
5. Date of development along the highway
6. Life cycle of abatement measures
7. Environmental impacts of abatement construction
8. Social, economic, environmental, legal and technological factors
9. Opinions of impacted residents
10. Input from the public and local agencies

The first five of these considerations were analyzed for this DEIR/EIS and the results are included in Appendix J, Preliminary Noise Abatement Analysis. Reasonable cost allowances are evaluated for those barriers, at highest height, that was determined to be feasible and reasonable. For any of the noise barriers to be considered reasonable from a cost perspective, the *total estimated cost* of the barrier must be at or below the *total allowance* calculated for each noise barrier. The *total allowance* for each noise barrier is established by considering the total number of residences benefited multiplied by the allowance per residence, a factor that varies depending upon local conditions. A critical noise receptor is selected, which is the receiver which would have the highest predicted future traffic noise levels and represents the highest increase between existing and future build noise levels. (These cost allowance calculations are included in the *Traffic Noise Impact Technical Report*, *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum, Traffic Noise Impact Technical Report and Traffic Noise Impact Technical Report Reduced Build Alternative (Revised) Addendum Rossmoor, and Traffic Noise Impact Technical Report and Traffic Noise Impact Technical Report Reduced Build Alternative (Revised) Addendum Garden Grove*).

The *total estimated cost* of a noise barrier is based on an engineer's preliminary estimate that includes all items appropriate or necessary for the construction of the barrier, such as traffic control, drainage modification, retaining walls, etc. A summary of the results of the reasonable analysis, including the number of residence benefited from each noise barrier, is presented in Appendix J.

The life cycle of noise abatement (factor 6) is considered when planned future use would limit the useful life of the abatement measure to less than 15 years. Considerations 7 and 8 are analyzed throughout this FEIS/EIR, with the impacts, if any, specifically described (particularly in Sections

4.10, Parks and Recreation, and 4.13, Visual Resources). Based on this feasibility and reasonability analysis, the *Preliminary Noise Abatement Decision* has been made, which is presented in Figures 4.9-1 (Noise Barrier Locations), and Tables 4.9-11 to 4.9-14. During the public review period for the DEIR/EIS, impacted residents, the general public, and local agencies had the opportunity to comment on the *Preliminary Noise Abatement Decision*. These opinions, which represent the last two considerations for reasonability, are weighed in order to make the *Final Noise Abatement Decision,* which is presented in the Final EIS/EIR.

Preliminary information on the characteristics of potential noise abatement measures (e.g., physical location, length, and height of noise barriers) is provided in all *Traffic Noise Impact Technical Reports* and is summarized in this section. If pertinent parameters change substantially during the final project design, the preliminary noise abatement design may be changed or eliminated from the final project design. The final design of noise barriers, if included in this project, will be based on the final project design and public involvement processes.

Noise abatement for impacted commercial properties with outdoor use areas is considered differently. If noise barriers are feasible (that is, if they would result in a noise reduction of at least five dBA), then they may be provided if they are desired by the commercial property owners. Businesses such as automobile sales and fast-food restaurants often partially depend on freeway visibility for business, so noise barriers are not always desirable. Consultation with the property owners occurs during the public review process of the DEIR/EIS and during final project design to determine whether noise barriers would be provided.

4.9.4.2 ABATEMENT/MITIGATION

A. PREFERRED ALTERNATIVE / (ENHANCED) REDUCED BUILD ALTERNATIVE

Traffic Noise Abatement – Preliminary Noise Abatement Decision.

In summary, a total of 26 noise barriers considered for abatement were found to be feasible and reasonable under the Preferred Alternative / (Enhanced) Reduced Build Alternative. Two of these noise barriers (NB-11 and NB-12) are proposed for Bolsa Grande High School, Jordan Intermediate School, and Fairhaven Elementary School, while retrofitting (air conditioning) is proposed for Sunnyvale Elementary and Mitchell Elementary Schools. Jordan Intermediate School may also require retrofitting in the form of air-conditioning. For the three elementary schools in the Rossmoor Study area (Lee, Weaver, and Francis), at each of these schools the current and predicted traffic noise levels outside the school building were found not to approach the exterior NAC of 67 dBA and no abatement is proposed. At Eisenhower Elementary (air-conditioned), the existing 10 foot barrier will remain because extending the height of the barrier would not achieve the necessary 5 dBA reduction to be considered feasible.

NOI-(E)RB-1. Based on the *Traffic Noise Impact Technical Reports* (December 2000) and *Traffic Noise Impact Technical Report Addendum* (December 2002), noise barriers are proposed for the (Enhanced) Reduced Build Alternative, as shown in Figure 4.9-1 Noise Barrier Locations (at the end of this section) and Table 4.9-11, Existing, Predicted and Abated Future Noise Levels. A total of 28 noise barriers considered for abatement were found to be feasible. These noise barriers are the highest that are considered feasible. As shown in Table 4.9-11, each of these noise barriers would result in at least a five-dBA noise reduction at the critical receiver.

Table 4.9-11
EXISTING, PREDICTED AND ABATED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
1-A	68	69	**New noise barrier (NB-C1)[2].** Up to 4.9-meter-high (16-foot-high)	63	6
1-G	63	64	**New noise barrier (NB-C1)[2].** Up to 4.9-meter-high (16-foot-high)	55	9
1-K	60	60	**New noise barrier (NB-C1)[2].** Up to 4.9-meter-high (16-foot-high)	51	9
3	63	66	**None.** Existing 4.3-meter (14-foot) noise barrier[2] will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---
Blue Bell Park	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) This noise barrier[2] is highest available (16 feet).	69	---
B	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) This noise barrier[2] is highest available (16 feet)	69	---
Almond Park	68	70	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) This noise barrier[2] is highest available (16 feet)	70	---
5	67	75	**None.** Noise barrier (NB-2) will not be constructed because existing sound wall[2] (replaced by NB-2) will not be removed as originally planned. Therefore, NB-2 located at this location will not be constructed.	68	7
5-A*	67	75	**None.** Noise barrier (NB-2) will not be constructed because existing sound wall[2] (replaced by NB-2) will not be removed as originally planned. Therefore, NB-2 located at this location will not be constructed.	68	7
5-B	66	76	**None.** Noise barrier (NB-2) will not be constructed because existing sound wall[2] (replaced by NB-2) will not be removed as originally planned. Therefore, NB-2 located at this location will not be constructed.	66	10
6-a	74	74	**New noise barrier (NB-3).** Up to 4.9-meter-high (16-foot-high)	67	7
6-e	73	74	**New noise barrier (NB-3).** Up to 4.9-meter-high (16-foot-high)	65	9
6-j	66	67	**New noise barrier (NB-3).** Up to 4.9-meter-high (16-foot-high)	61	6
7	73	74	**New noise barrier (NB-5).** Up to 4.9-meter-high (16-foot-high)	66	8
C	74	75	**New noise barrier (NB-4).** Up to 4.9-meter-high (16-foot-high)	66	9
8	74	75	**New noise barrier (NB-4).** Up to 4.9-meter-high (16-foot-high)	66	9
9	74	75	**New noise barrier (NB-7).** Up to 4.9-meter-high (16-foot-high)	66	9
10	72	73	**New noise barrier (NB-6).** Up to 4.9-meter-high (16-foot-high)	66	7
10-A	72	73	**New noise barrier (NB-6).** Up to 4.9-meter-high (16-foot-high)	66	7

Table 4.9-11 (CONTINUED)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
11	71	72	**New noise barrier (NB-7).** Up to 4.9-meter-high (16-foot-high)	67	5
12	68	69	**New noise barrier (NB-8).** Up to 4.9-meter-high (16-foot-high)	61	8
M-1	65	68	**New noise barrier (NB-29).** Up to 4.9-meter-high (16-foot-high)	62	6
M-11	64	65	**New noise barrier (NB-29).** Up to 4.9-meter-high (16-foot-high)	58	7
13	69	70	**New noise barrier (NB-8).** Up to 4.9-meter-high (16-foot-high)	62	8
14	73	75	**New noise barrier (NB-9).** Up to 4.9-meter-high (16-foot-high)	68	7
15	70	72	**New noise barrier (NB-9).** Up to 4.9-meter-high (16-foot-high)	67	5
D	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 67 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	68	---
15-A	65	67	**New noise barrier (NB-9).** Up to 4.9-meter-high (16-foot-high)	62	5
16	68	72	**New noise barrier (NB-10).** Up to 4.9-meter-high (16-foot-high)	63	9
16-A	75	78	**New noise barrier (NB-9).** Up to 4.9-meter-high (16-foot-high)	63	15
16-B	73	73	**New noise barrier (NB-9).** Up to 4.9-meter-high (16-foot-high)	58	15
17	66	71	**New noise barrier (NB-10).** Up to 4.9-meter-high (16-foot-high)	62	9
18*	70	76	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	64	12
Bolsa Grande High School Playground	69	74	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	64	10
19	68	74	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	65	9
20	69	74	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	64	10
E	71	73	**New noise barrier (NB-12).** Up to 4.9-meter-high (16-foot-high)	64	9
21	72	74	**New noise barrier (NB-12).** Up to 4.9-meter-high (16-foot-high)	64	10
Excelsior Elem. School Playground	70	72	**New noise barrier (NB-12).** Up to 4.9-meter-high (16-foot-high)	64	8
21-A	72	74	**New noise barrier (NB-12).** Up to 4.9-meter-high (16-foot-high)	66	8
22	68	69	**New noise barrier (NB-13).** Up to 4.9-meter-high (16-foot-high)	63	6
22-A	65	67	**New noise barrier (NB-13).** Up to 4.9-meter-high (16-foot-high)	58	9
22-B*	70	70	**New noise barrier (NB-13A).** Up to 4.9-meter-high (16-foot-high)	62	8
23	66	68	**New noise barrier (NB-14).** Up to 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 23-A.)*	67	1

Table 4.9-11 (CONTINUED)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
23-A	72	73	**New noise barrier (NB-14).** Up to 4.9-meter-high (16-foot-high)	65	8
24	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	68	---
25	67	70	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 4 dBA to 66 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	70	---
F	66	69	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 69 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	69	---
Eisenhower Elem. School Playground	66	69	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 3 dBA to 66 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	69	---
26	66	68	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1].	68	---
27	66	68	**New noise barrier (NB-16).** Up to 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 27-A.)*	64	4
27-A	73	76	**New noise barrier (NB-16).** Up to 4.9-meter-high (16-foot-high)	69	7
27-B	72	75	**New noise barrier (NB-15).** Up to 4.9-meter-high (16-foot-high)	67	8
G	63	66	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 65 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	66	---
G-A	64	67	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 66 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	67	---
27-I	65	67	**None.** Noise barrier (NB-30) not reasonable.	62	5
40-W	66	67	**None.** Noise barrier (NB-28) not reasonable.	62	5
28	65	73	**New noise barrier (NB-18).** Up to 4.9-meter-high (16-foot-high)	64	9

Table 4.9-11 (CONTINUED)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
(ENHANCED) REDUCED BUILD ALTERNATIVE
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
28-A	68	70	**New noise barrier (NB-18).** Up to 4.9-meter-high (16-foot-high)	65	5
28-B	65	69	**New noise barrier (NB-18).** Up to 4.9-meter-high (16-foot-high)	65	4
28-C	61	68	**New noise barrier (NB-18).** Up to 4.9-meter-high (16-foot-high)	60	8
29	67	68	**None.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 67 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	68	---
29-c	65	67	**None.** Highest available noise barrier (16-foot NB-19) not feasible (will not reduce by at least 5 dBA).	63	4
29-M	63	66	**None.** Highest available noise barrier (16-foot NB-19) not feasible (will not reduce by at least 5 dBA).	63	3
29-M1	65	66	**None.** Highest available noise barrier (16-foot NB-19) not feasible (will not reduce by at least 5 dBA).	65	1
29-B	63	64	**None.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 63 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	64	---
29-C	67	72	**New noise barrier (NB-20).** Up to 4.9-meter-high (16-foot-high)	64	8
29-D	69	70	**New noise barrier (NB-21).** Up to 4.9-meter-high (16-foot-high)	61	9
30	67	68	**New noise barrier (NB-21).** Up to 4.9-meter-high (16-foot-high)	62	6
30-A**	68	70	**New noise barrier (NB-22).** Up to 4.9-meter-high (16-foot-high)	*65*	*5*
H-29**	70	71	**None.** Raise from existing 2.4-meter (8-foot) up to 4.9-meter-high (16-foot-high) not reasonable.	66	5
H-26**	74	75	**None.** Raise from existing 2.4-meter (8-foot) up to 4.9-meter-high (16-foot-high) not reasonable.	64	11
H-6**	70	72	**New noise barrier (NB-31).** Up to 4.9-meter-high (16-foot-high)	63	9
31**	66	67	**New noise barrier (NB-23).** Up to 4.9-meter-high (16-foot-high)	59	8
31-B**	73	75	**New noise barrier (NB-23).** Up to 4.9-meter-high (16-foot-high)	64	11
32-2**	66	69	**None.** Noise barrier (NB-32) not reasonable.	64	5

1. The policy issue regarding feasibility criteria for the height extension of the existing noise barrier will be further analyzed during the final design phase.
2. The endings of each proposed/existing noise barrier will be further analyzed and evaluated during the design phase.

* These sites had properties that were either proposed for displacements or acquisitions during the DEIR/EIS. However, the displacements or acquisitions are no longer applicable at these sites.

**These sites were added for the noise study as a result of the extension of the eastern terminus from Glassell Street to approximately SR-55

In order to make the proposed noise barriers reasonable, the construction cost of the proposed noise barrier needs to be lower than the total reasonable allowance cost. If the construction cost is higher than the allowance cost, such noise barrier will be considered not reasonable and will not be proposed. The final reasonableness determination will be made during the design phase.

NOI-(E)RB-2. Noise abatement at schools is shown in Table 4.9-12. At Jordan Intermediate School, predicted interior traffic noise levels at the closest school building to SR-22 would be 61 dBA and would be reduced to 56 dBA with the proposed noise abatement (NB-11). The school buildings are not air-conditioned; therefore, the expected interior noise levels would exceed the NAC of 52 dBA at the closest building. This school is a large campus with many buildings that, because of their location, provide additional noise reduction in the form of shielding to other buildings on campus. Please note that NB-11 is currently under construction in order to reduce the noise at Jordan Intermediate School. Further study will be conducted to determine if after the construction of NB-11, additional noise abatement is required for the school's classrooms. This additional abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels are expected to be below 51 dBA at the closest school building to SR-22.

Table 4.9-12
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS AT SCHOOL INTERIORS
(ENHANCED) REDUCED BUILD ALTERNATIVE
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abatement** in Leq(h), dBA	**Noise Reduction** in dBA
Bolsa Grande High School Bldg. Interior (not air-conditioned)	50	55	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	50	5
Jordan Intermed. School Bldg. Interior (not air-conditioned)	59	61	**New noise barrier (NB-11).** Up to 4.9-meter-high (16-foot-high)	56	5
Excelsior Elem. School Bldg. Interior (not air-conditioned)	56	58	**New noise barrier (NB-12).** Up to 4.9-meter-high (16-foot-high)	51	7
Fairhaven Elem. School Bldg. Interior (air-conditioned)	49	50	**None required.** **New noise barrier (NB-23).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not required or feasible for this receiver site, it will be provided for other sites in the same area, such as 31 and 31-B.)*	46	4
Eisenhower Elem. School Bldg. Interior (air-conditioned)	47	50	**None required.** Existing 3.0-meter (10-foot) noise barrier will remain.	50	---

At Excelsior Elementary School, predicted interior traffic noise levels at the closest school building to SR-22 would be 58 dBA and would be reduced to 51 dBA with the proposed noise abatement (NB-12). The school buildings are not air-conditioned; therefore, the expected interior noise levels would approach (come within one dBA of) the NAC of 52 dBA at the closest building. Further study will be conducted to determine if, after the construction of NB-12, additional noise abatement is required for the school's classrooms. If required, this abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels are expected to be below 51 dBA at the closest school building to SR-22.

Construction Noise Abatement/Mitigation.

NOI-(E)RB-3. The contractor will comply with the noise ordinances of the County of Orange and the Cities of Los Alamitos, Seal Beach, Westminster, Garden Grove, Santa Ana and Orange. These ordinances regulate the level of noise that may be generated as a result of construction activity. The specific requirements of these noise ordinances, which primarily regulate the hours of the day when construction activity is allowed, are listed in Table 4.9-13.

Table 4.9-13
Local Noise Ordinance Construction ABATEMENT/Mitigation

City	Noise Abatement/Mitigation Measures
Los Alamitos	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Seal Beach	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Westminster	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Garden Grove	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.
Orange	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.
Santa Ana	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Tustin	Construction limited to the hours of 7 a.m. to 6 p.m., Monday through Friday; 9 a.m. to 5 p.m., Saturday. No construction allowed on Sundays and holidays.
Orange County and Rossmoor	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.

NOI-(E)RB-4. As the site-specific construction plan is developed, existing natural and artificial barriers, such as ground elevation changes and existing buildings, shall be considered for use as shielding against construction noise.

NOI-(E)RB-5. Noise barriers and noise barrier additions required for long-term noise abatement/mitigation will be constructed during the initial stages, where feasible, to reduce the impacts of construction noise.

NOI-(E)RB -6. In areas where pile driving and similar activities would occur in close proximity to noise-sensitive land uses, alternate methods of construction will be used where feasible. For pile driving, possible alternate methods include vibration or hydraulic insertion of piles or drilled holes for cast-in-place piles.

NOI-(E)RB -7. The contractor shall comply with the Department's Standard Specifications, "Sound Control Requirements," and all local sound-control and noise level rules, regulations and ordinances that apply.

NOI-(E)RB -8. Each internal combustion engine used for any purpose on the construction of the project or related to the project will be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such a muffler.

NOI-(E)RB -9. Community meetings will be held to explain to the area residents about the construction work, time involved and the control measures to be taken to reduce the impact of the construction noise.

ROSSMOOR STUDY AREA
(SEAL BEACH BOULEVARD AT SR-22 TO KATELLA AVENUE AT I-605)

NOI-(E)RB-10. Based on the *Traffic Noise Impact Technical Report Rossmoor Addendum* (September 2002), noise barrier (NB-R1) is proposed for Rossmoor Area, as shown in Figure 4.9-1 (at the end of this section) and Table 4.9-14. This barrier would fill the gap between two existing state noise barriers and at a height of 4.9 m (16 ft) would provide 5 dBA or more noise reduction.

Table 4.9-14
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
ROSSMOOR STUDY AREA
(NB-R1 ALONG I-405/I-605 MAINLINE)
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement In Leq(h), dBA	Noise Reduction in dBA
1-15A	67	68	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 ft).	68	---
1-15B	66	67	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 feet).	67	---
1-24	67	68	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 ft).	68	---
1A-15A	62	64	**None.** Existing 4.9-meter (16 foot) This noise barrier is highest available (16 feet).	64	---
1A-15B	61	63	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 feet).	63	---
1B-15A*	60	64	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 feet).	64	---
1B-15B*	59	61	**None.** Existing 4.9-meter (16-foot) This noise barrier is highest available (16 feet).	61	---
2-15A	62	64	**New noise barrier (NB-R1).** Up to 4.9-meter-high (16-foot-high)	59	5
2-15B	59	61	**New noise barrier (NB-R1).** Up to 4.9-meter-high (16-foot-high)	61	0
2-24	68	70	**New noise barrier (NB-R1).** Up to 4.9-meter-high (16-foot-high)	62	8
2A-15A	70	72	**New noise barrier (NB-R1).** Up to 4.9-meter-high (16-foot-high)	63	9
2A-15B	63	65	**New noise barrier (NB-R1).** Up to 4.9-meter-high (16-foot-high)	64	1
Francis Elementary School	62	64	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 64 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	64	---
2B-15A	67	69	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 3 dBA to 66 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	69	---

* These sites had properties that were either proposed for displacements or acquisitions during the DEIR/EIS. However, the displacements or acquisitions are no longer applicable at these sites.

Table 4.9-14 (CONTINUED)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
ROSSMOOR STUDY AREA
(NB-R1 ALONG I-405/I-605 MAINLINE)
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement In Leq(h), dBA	Noise Reduction in dBA
2B-15B	64	66	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 65 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	66	---
3A-15A	68	69	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	69	---
3-15A	68	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 2 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	70	---
3-15B	68	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 2 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	70	---
3-24	71	71	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 1 dBA to 70 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	71	--

[1]. The policy issue regarding feasibility criteria for the height extension of the existing noise barrier will be further analyzed during the final design phase

In addition, Noise Barrier NB-C2 is being considered for construction on the elevated northbound 1-405/I-605 HOV Connector. The noise barrier would add to the noise reduction provided by NB-R1 and NB-C1 (for College Park West Community). However, adding a noise barrier on the I-405/I-605 Connector (NB-R2) would result in minimal additional noise reduction to the residences that would be benefited by NB-R1. This is because the HOV Connector is further from the residences and would have lower traffic volumes than I-405 and I-605.

In order to make the proposed noise barrier NB-C2 reasonable, the construction cost of the proposed noise barrier needs to be lower than the total reasonable allowance cost. If the construction cost is higher than the allowance cost, such noise barrier will be considered not reasonable and will not be proposed. A preliminary reasonableness determination is prepared and presented in Appendix J. Any remaining allowance from constructing NB-R1 and NB-C1 would be used to construct NB-C2 (on HOV connector), however final determination on NB-C2 will be made during final design after considering public input, safety of sight distance, comparability with other connectors, and other design and construction constraints.

GARDEN GROVE STUDY AREA
(MAGNOLIA STREET TO HAVENWOOD STREET)

NOI-(E)RB-11. Based on the Traffic Noise Impact Technical Report Garden Grove Addendum (October 2002), noise barriers (NB-G1, NB-G2, and NB-G3) are proposed for the Garden Grove area as shown in Table 4.9-15. These three noise barriers have been determined to be feasible as they provide a minimum of 5 dBA or more noise reduction at the lots of various car dealerships and outdoor eating area of an In-N-Out restaurant, but not at the residential and school sites north of Trask Avenue. Noise barriers within the freeway right-of-way are not feasible at the residential and school sites located north of Trask Avenue primarily because the reduction in SR-22 freeway traffic noise provided by noise barriers is negated by the traffic noise from Trask Avenue

These noise barriers would provide noise abatement for the commercial uses (car lots) and In-N-Out restaurant. Typically, such noise barriers will not be acceptable by car dealerships or commercial property due to loss of visibility from the freeway. Therefore, public involvement will be a factor in the final decision on barrier construction. Consultation with the property owners during the public review process of the FEIS/EIR and during final project design will determine whether noise barriers would be provided. At this time, the location of these noise barriers is not shown in Figure 4.9.1.

Table 4.9-15
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
GARDEN GROVE STUDY AREA
(FOR PROPOSED HEIGHT OF NOISE BARRIER, SEE APPENDIX J)

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
18-A	74	75	**None proposed.** Noise barrier (NB-G1) not reasonable.	68	7
T-1	73	74	**None proposed.** Noise barrier (NB-G1) not reasonable.	71	3
T-2M	74	77	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	69	8
T-2	69	71	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	67	4
T-3	69	70	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	69	1
T-4	71	72	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	70	2
T-24A	71	72	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	69	3
19-A	74	74	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	66	8
T-5M	74	75	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	69	6
T-5	60	62	**New noise barrier (NB-G2).** Up to 4.9-meter-high (16-foot-high)	59	3
T-6M	74	74	**New noise barrier (NB-G3).** Up to 4.9-meter-high (16-foot-high)	68	6
T-6	70	71	**New noise barrier (NB-G3).** Up to 4.9-meter-high (16-foot-high)	68	3
20-A	70	74	**New noise barrier (NB-G3).** Up to 4.9-meter-high (16-foot-high)	64	10
T-7	66	67	**New noise barrier (NB-G3).** Up to 4.9-meter-high (16-foot-high)	66	1
T-8	72	73	**None (Not Feasible)**	70	3
T-24B	68	70	**None (Not Feasible)**	66	4
T-9	67	69	**None (Not Feasible)**	66	3
T-10	66	67	**None (Not Feasible)**	63	4
T-11	71	72	**None (Not Feasible)**	68	4

NOI-(E)RB-12. Noise abatement at schools in the Garden Grove Study Area is shown in Table 4.9-16. At Classroom 24 of Sunnyside Intermediate School, predicted future worst-hour interior noise level of 54 dBA with the windows opened would exceed the Caltrans/FHWA interior NAC of 52 dBA. Air-conditioning would be provided as noise abatement for this school building, which includes Classrooms 21, 22, 23, 24, 25, 26 & 27. With the windows closed, the predicted future worst-hour interior traffic noise levels would be 41 dBA, which would not approach or exceed the Caltrans/FHWA interior NAC of 52 dBA.

At Classroom 4 of Mitchell Elementary School, the predicted future worst-hour interior noise levels of 62 dBA, with the windows opened, would exceed the Caltrans/FHWA interior NAC of 52 dBA. There is one other classroom in this building and four classrooms in two other buildings, which are not air-conditioned, that would also be impacted. Since these other classrooms have the same traffic noise exposure and the same exterior window/wall construction as Classroom 4, the predicted interior noise levels would be the same as Classroom 4. As noise abatement for this school, air-conditioning would be provided for six rooms, Classrooms 3, 4, 6, 7, K-A, and K-B. With the windows closed, the predicted future worst-hour interior noise levels would be 49 dBA,

which would not approach or exceed the Caltrans/FHWA interior NAC of 52 dBA.

Table 4.9-16
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS AT SCHOOL INTERIORS
GARDEN GROVE STUDY AREA

Site ID No.	Existing Modeled Noise Level In Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
Sunnyside Elementary School Building – Closest building without air-conditioning to Trask Ave. (Classroom 25)	53	54	**Air Conditioning**	41	13
Mitchell Elementary School Building – Closest building without air-conditioning to Trask Ave. (Classroom 4)	62	62	**Air Conditioning**	49	13

B. OTHER ALTERNATIVES

1. NO BUILD ALTERNATIVE

Although there are existing conditions (No Build Alternative conditions) that exceed the FHWA NAC, no noise abatement/mitigation is proposed for the No Build Alternative. Because the No Build Alternative does not include a build project, there would be no mechanisms in this alternative to allow construction of noise abatement.

2. TSM/EXPANDED BUS SERVICE ALTERNATIVE

Although there are existing conditions that exceed the FHWA NAC and these conditions would not be changed under the TSM/Expanded Bus Service Alternative, no noise abatement/mitigation is proposed. Because this alternative does not propose construction on the freeways, there would be no mechanisms in this alternative to allow construction of noise abatement

3. FULL BUILD ALTERNATIVE

The preliminary noise abatement decision for the Full Build Alternative is covered in Section 4.9.4.2.A for (Enhanced) Reduced Build Alternative including Rossmoor and Garden Grove study areas. The preliminary noise abatement decision for the Pacific Electric Arterial, SR-22/SR-55 Interchange, and City Drive where the (Enhanced) Reduced Build and Full Build Alternatives do not share common project features is discussed herein.

NOI-FB-1. Based on the *Traffic Noise Impact Technical Reports* (December 2000), additional noise barriers are proposed for the Full Build Alternative, as shown in Figure 4.9-2 Noise Barrier Locations (at the end of this section) and Table 4.9-17, Existing, Predicted and Abated Future Noise Levels. A total of 3 additional noise barriers considered for abatement were found to be feasible. These noise barriers are the highest that are considered feasible.

As shown in Table 4.9-17, each of these noise barriers would result in at least a five-dBA noise reduction at the critical receiver.

Table 4.9-17
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level In Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement[2] *(Noise barriers numbers cross-reference to Figure 4.9-2)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
G	63	73	**New noise barrier (NB-17).** 4.9-meter-high (16-foot-high)	66	7
J	65	65	**None required.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 65 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	65	---
31-A	69	70	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce 3 dBA to 67 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	70	---
I	70	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 70 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	70	---
32	67	67	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 67 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	67	---
32-A	68	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Extending noise barrier to 4.9 meter will reduce less than 0.5 dBA to 68 dBA which will not meet feasible criteria (will not reduce by at least 5 dBA)[1]	68	---
33	51	75	**New noise barrier (NB-24).** 4.9-meter-high (16-foot-high)	62	13
33-A	51	70	**New noise barrier (NB-25).** 4.9-meter-high (16-foot-high)	58	12
Willowick Muni. Golf Course	51	70	**New noise barrier (NB-25).** 4.9-meter-high (16-foot-high)	60	10
34	56	66	**None proposed.** Noise barrier (NB-26) not reasonable.	66	---

1. The policy issue regarding feasibility criteria for the height extension of the existing noise barrier will be further analyzed during the final design phase.
2. The endings of each proposed/existing noise barrier will be further analyzed and evaluated during the design phase.

In addition to the schools studied under (Enhanced) Reduced Build Alternative including the Rossmoor and Garden Grove study areas, the preliminary analysis of the noise abatement for the interiors of school buildings nearest to the Full Build Alternative improvements is summarized in Table 4.9-18. This table shows that the school interior NAC would be not exceeded at Spurgeon Intermediate School. Therefore, no abatement for interior noise will be proposed.

Table 4.9-18
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS AT SCHOOL INTERIORS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
Spurgeon Intermed. School Bldg. Interior (air-conditioned)	< 43	43	**None required.**	43	---

NOI-FB-2. Multiple reflections between reflective parallel noise barriers (noise barriers on each side of a roadway) can potentially reduce the acoustical performance of each individual barrier. How much degradation takes place depends on the final site geometry and barrier configurations. An important relationship is the ratio of the separation between two parallel barriers (W) and their average height (H-Average). As a general rule, if the W/H-Average ratio is 10:1 or greater, the insertion loss degradation is less than three dBA, and not noticeable to the human ear. Assuming the maximum noise barrier height of 4.9 meters (16 feet), the width separating each of the parallel noise barriers on this project would be greater then 10:1 throughout the Full Build Alternative, with the exception of the location along the Pacific Electric Arterial, where NB-24 and NB-25 are parallel. Additional study will be required during final design to determine how to mitigate the potential performance degradation of parallel noise barriers NB-24 and NB-25. Measures to reduce the sound reflections between these two parallel barriers could include providing a sound absorptive finish to the traffic side of each barrier.

4.9.5 RESIDUAL IMPACTS AFTER NOISE ABATEMENT/MITIGATION

Residual impacts after noise abatement/mitigation would remain at some locations because either no abatement is proposed for a substantial impact or because the impacts would not be mitigated to less than substantial by the proposed abatement. There would be no impacts that cannot be fully mitigated to less than substantial, as defined by the Department (i.e., a 12 dBA increase).

A. PREFERRED ALTERNATIVE / (ENHANCED) REDUCED BUILD ALTERNATIVE

Under CEQA, a project would have a significant effect on the environment if it would increase substantially the ambient noise levels (CEQA Guidelines) for adjoining areas, which is defined by the Department as an increase of 12 dBA. There would be no locations where a 12-dBA increase would remain after abatement; hence, residual noise impact would be minimal for the (Enhanced) Reduced Build Alternative.

The federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement at 30 receivers for the (Enhanced) Reduced Build Alternative. At 15 of these, there would be an increase in the noise levels attributable to the (Enhanced) Reduced Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. (At 15 additional sites, noise levels after abatement would be above the NAC, but these levels would be at or below the existing level, so all impacts resulting from the (Enhanced) Reduced Build Alternative would be fully abated.) Thus, residual noise levels after abatement resulting from the (Enhanced) Reduced Build Alternative would occur at 15 category B receivers, but none of these would represent a substantial residual noise impact as defined by the Department standards.

ROSSMOOR STUDY AREA
(SEAL BEACH BOULEVARD AT SR-22 TO KATELLA AVENUE AT I-605)

The federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement at 9 receivers at Rossmoor Area for the (Enhanced) Reduced Build Alternative. At 8 of these, there would be an increase in the noise levels attributable to the (Enhanced) Reduced Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. Thus, residual noise levels after abatement resulting from the (Enhanced) Reduced Build Alternative would occur at only 8 category B receiver, but none of these would represent a substantial residual noise impact as defined by the Department.

GARDEN GROVE STUDY AREA
(MAGNOLIA STREET TO HAVENWOOD STREET)

The federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement at 11 receivers in the Garden Grove area for the (Enhanced) Reduced Build Alternative. However, none of these would result in an increase in the noise levels attributable to the (Enhanced) Reduced Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. None of the commercial sites will approach the federal and state noise abatement criterion of 72 dBA for category C uses after abatement. Thus, after abatement, these increases resulting from the (Enhanced) Reduced Build Alternative would not represent a substantial residual noise impact as defined in the Department‘s standards.

B. OTHER ALTERNATIVES

1. NO BUILD ALTERNATIVE

Since there are existing conditions (No Build Alternative conditions) that exceed the FHWA NAC and no abatement is proposed for the No Build Alternative beyond the existing Community Noise Abatement program, these existing impacts would remain. Because the No Build Alternative would not result in a 12-dBA increase in noise, no residual noise impact would occur, as defined by the Department standards.

2. TSM/EXPANDED BUS SERVICE ALTERNATIVE

Because there are existing conditions that exceed the FHWA NAC and that would not be improved under the TSM/Expanded Bus Service Alternative beyond the existing Community Noise Abatement program, and because no abatement is proposed, these existing impacts would remain. Because the TSM/Expanded Bus Service Alternative would not result in a 12-dBA increase in noise, no residual noise impact would occur, as defined by the Department standards.

3. FULL BUILD ALTERNATIVE

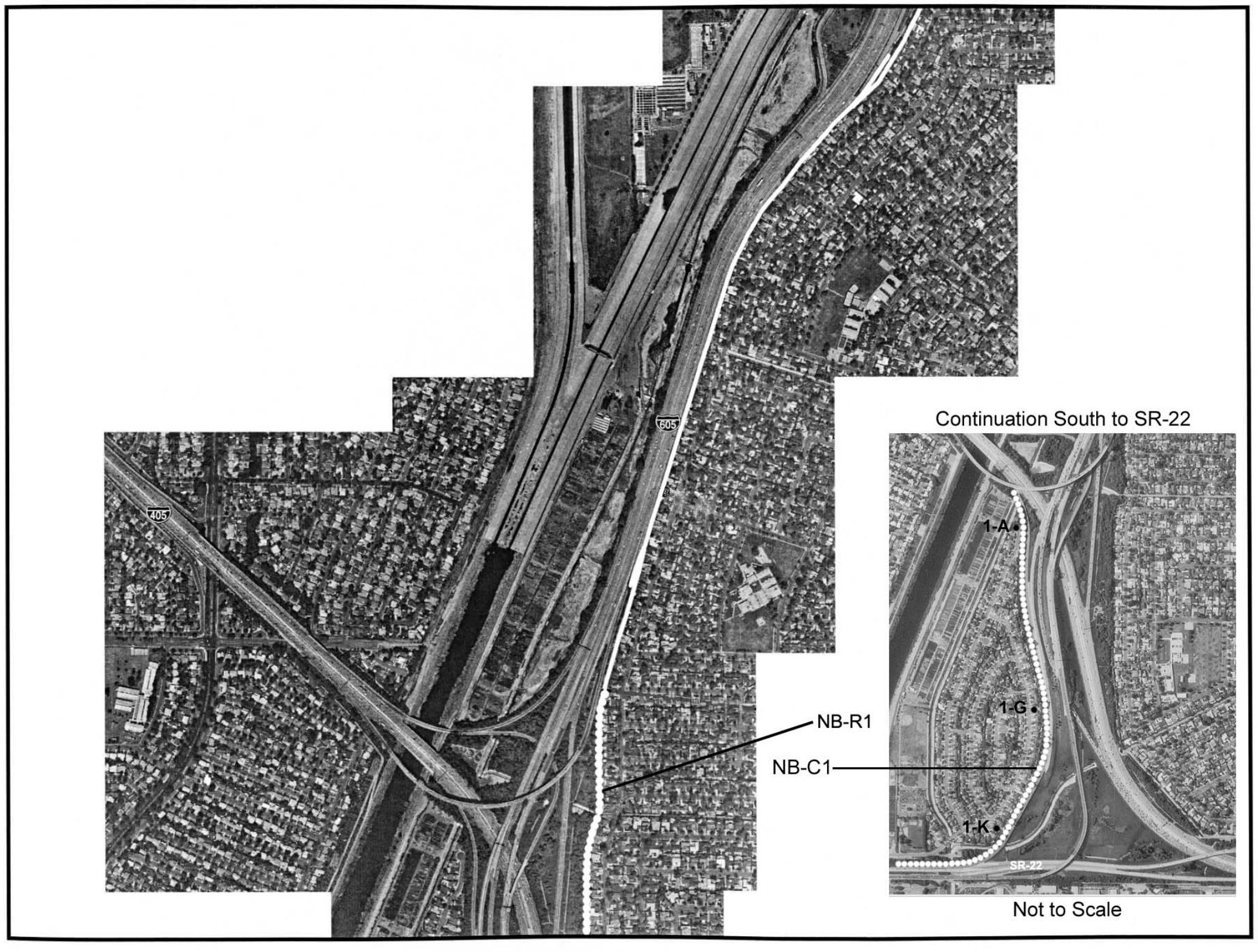
Under CEQA, a project would have a significant effect on the environment if it would increase substantially the ambient noise levels for adjoining areas; such increase is defined by the Department as an increase of 12 dBA. There would be no locations where a 12-dBA increase would remain after abatement, so minimal residual noise impact would remain under the Full Build Alternative.

In additional to the residual impact under (Enhanced) Reduced Build Alternative (Section 4.9.5.A), the federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement at additional 6 receivers for the Full Build Alternative. At three of these, there would be an increase in the noise levels that is attributable to the Full Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. Thus, residual noise levels after abatement resulting from

the Full Build Alternative would occur at three category B receivers, but none of these would represent a substantial residual noise impact, as defined by Caltrans.

A final noise abatement analysis will be conducted during final design to reevaluate sensitive receptors where predicted noise would increase 12 or more decibels over ambient or where noise levels would approach or exceed the category B NAC (i.e., 66 dBA or greater). A final decision on the installation of noise abatement measures will be made upon completion of the project design and the public involvement process. Decisions on final design will be consistent with the latest FHWA/Department criteria (23 CFR Part 772) and state noise policies at the time the project is advertised for construction. If additional significant noise impacts would occur, as defined by CEQA, supplemental documentation would be required.

Construction noise is only considered to be substantial in exceptional cases, such as pile driving and crack and seal pavement rehabilitation operations. Otherwise, the Department's Standard Specifications (Section 7 and 42) and Standard Special Provisions provide limits on construction noise levels, with normal construction noise levels not exceeding 86 dBA at a distance of 15 meters (50 feet). The Full Build Alternative may require pile driving and/or crack and seal pavement rehabilitation, however, the use of alternate method would reduce this impact to less than substantial.



SR-22/West Orange County Connection Project

Proposed Noise Barriers (Enhanced) Reduced Build Alternative

LEGEND

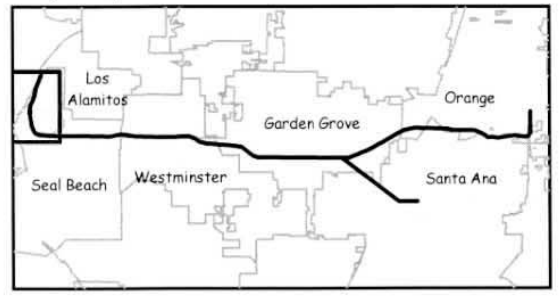
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

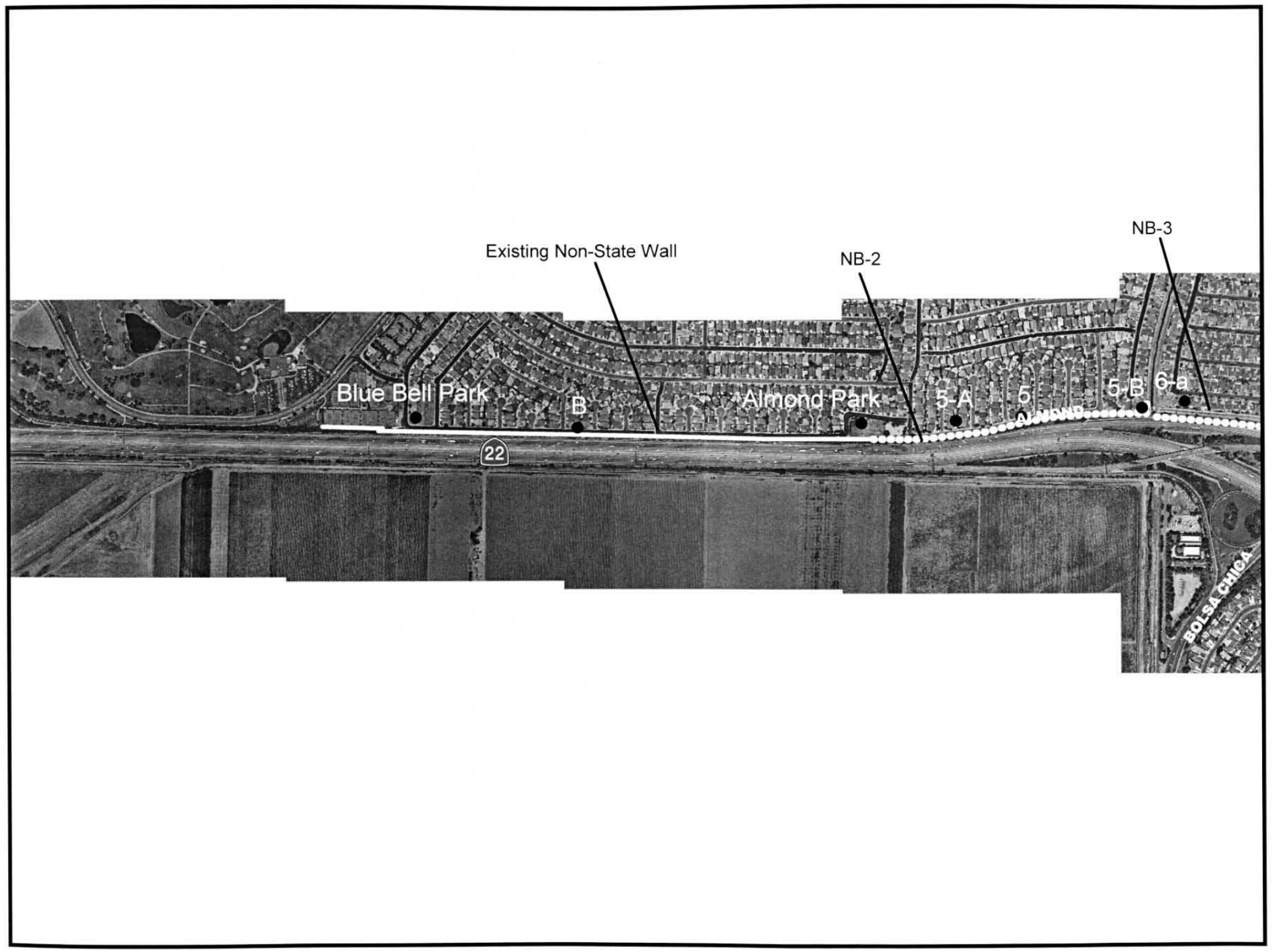
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1A



SR-22/West Orange County Connection Project

Proposed Noise Barriers (Enhaced) Reduced Build Alternative

LEGEND

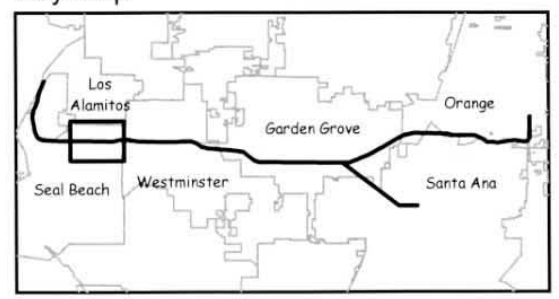
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

Key Map



0.1 0 0.1 0.2 Miles

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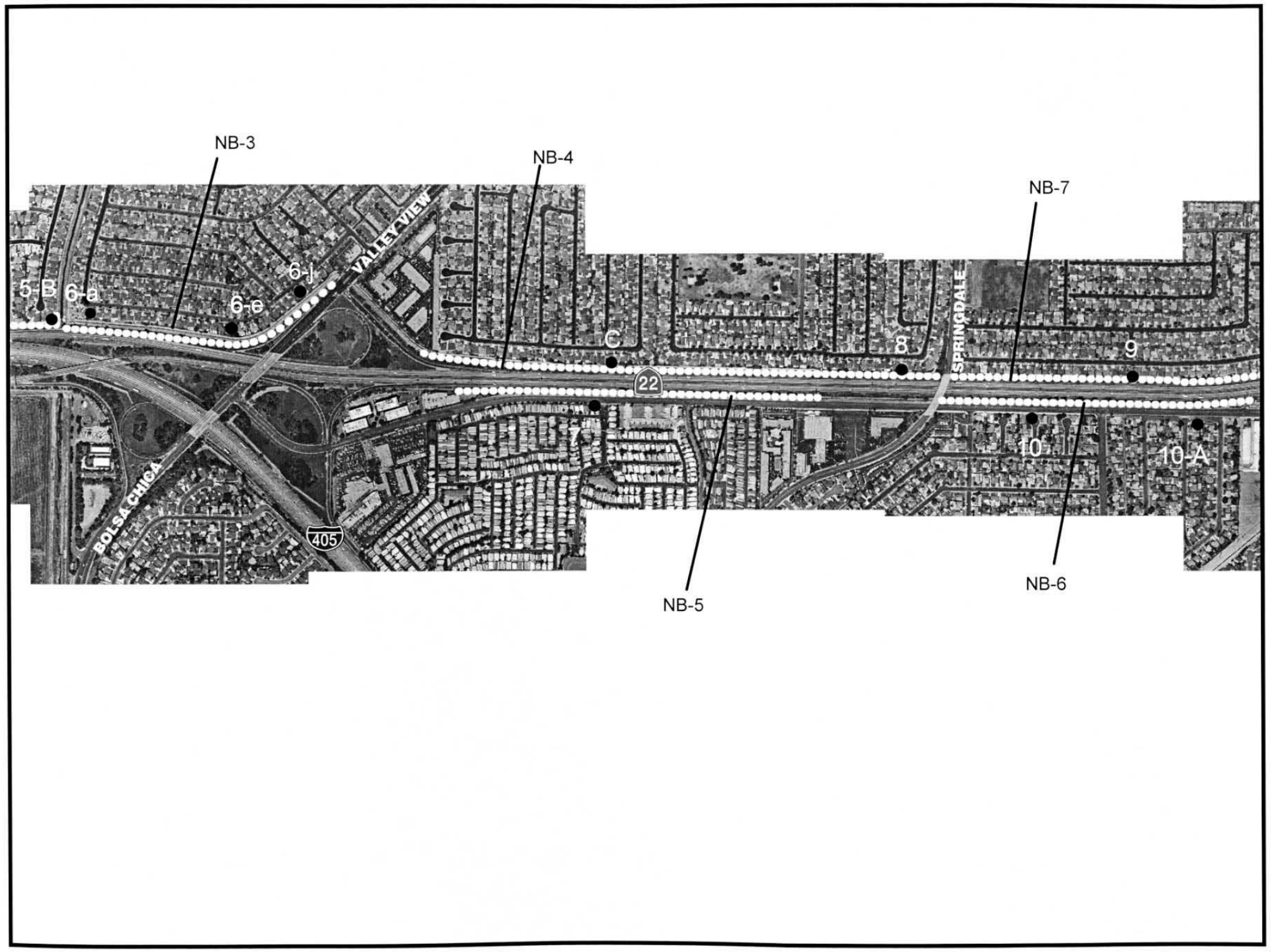
Figure 4.9-1B



SR-22/West Orange County Connection Project

Proposed Noise Barriers
(Enhanced) Reduced Build Alternative

LEGEND

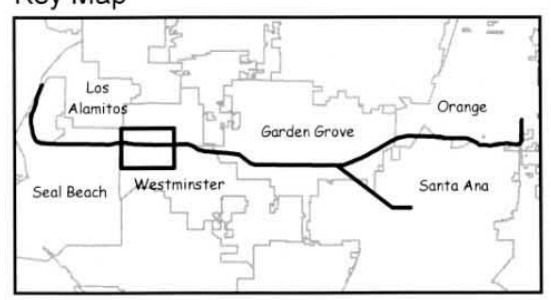
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

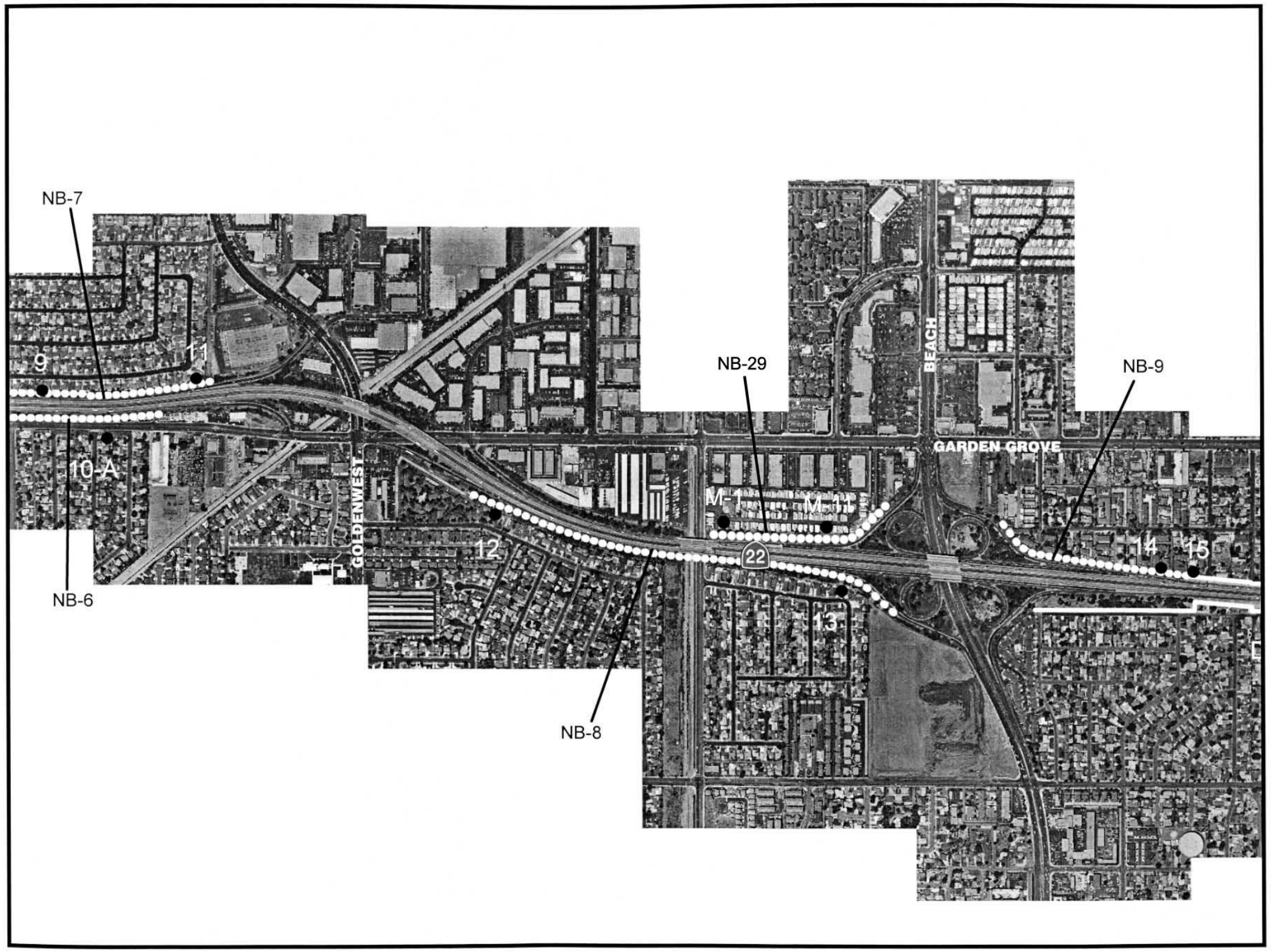
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1C



SR-22/West Orange County Connection Project

Proposed Noise Barriers
(Enhanced) Reduced Build Alternative

LEGEND

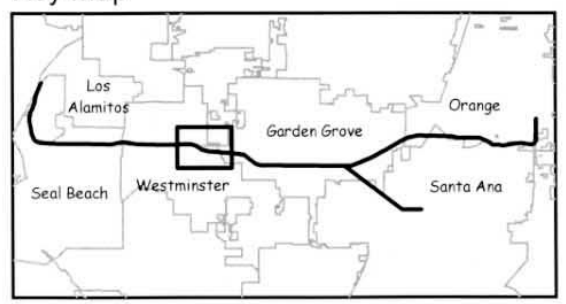
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision*.

Note: Noise barrier locations are approximate only.

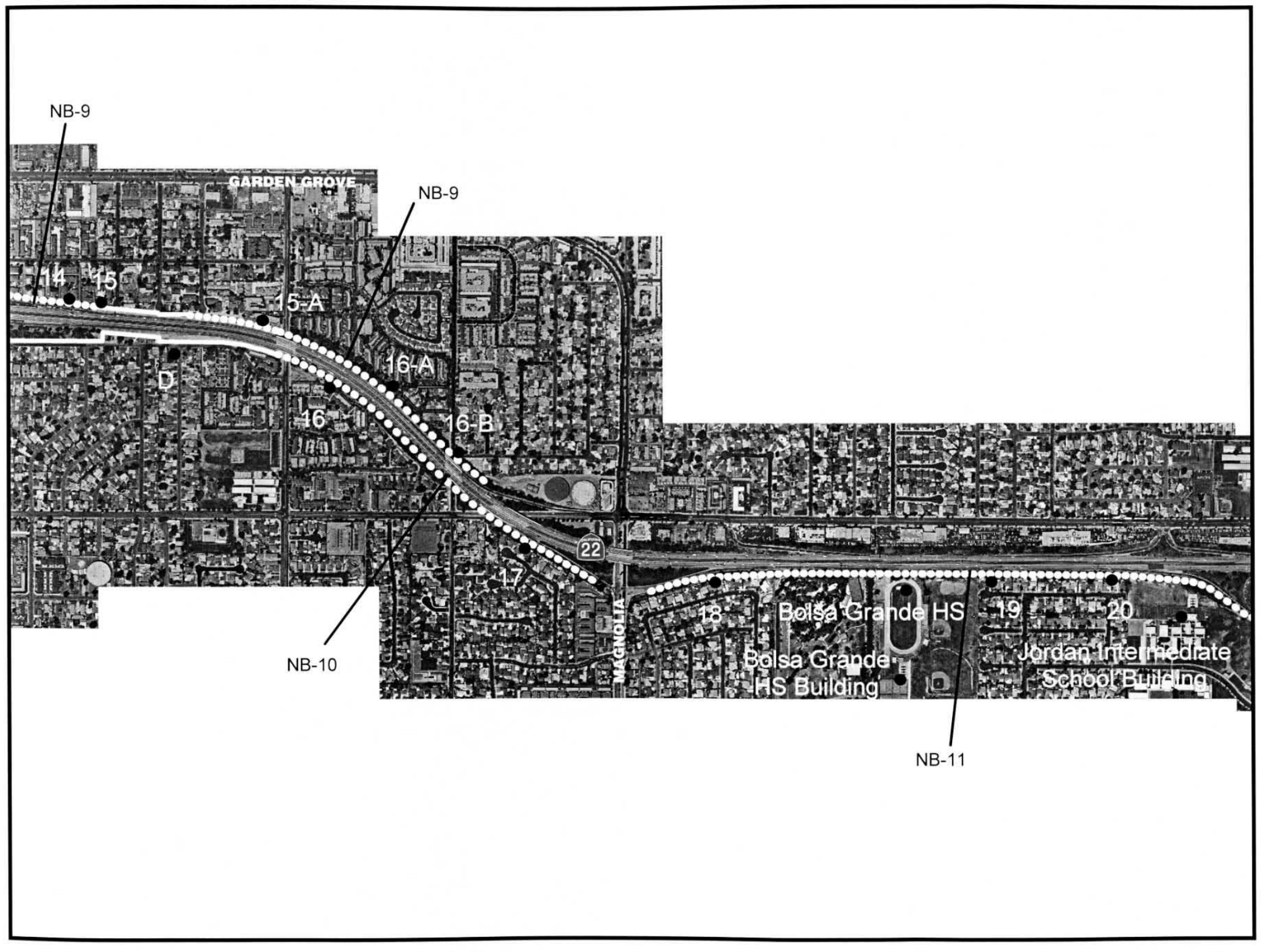
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1D



SR-22/West Orange County Connection Project

Proposed Noise Barriers (Enhanced) Reduced Build Alternative

LEGEND

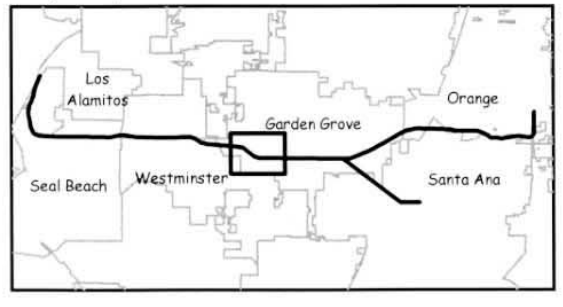
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

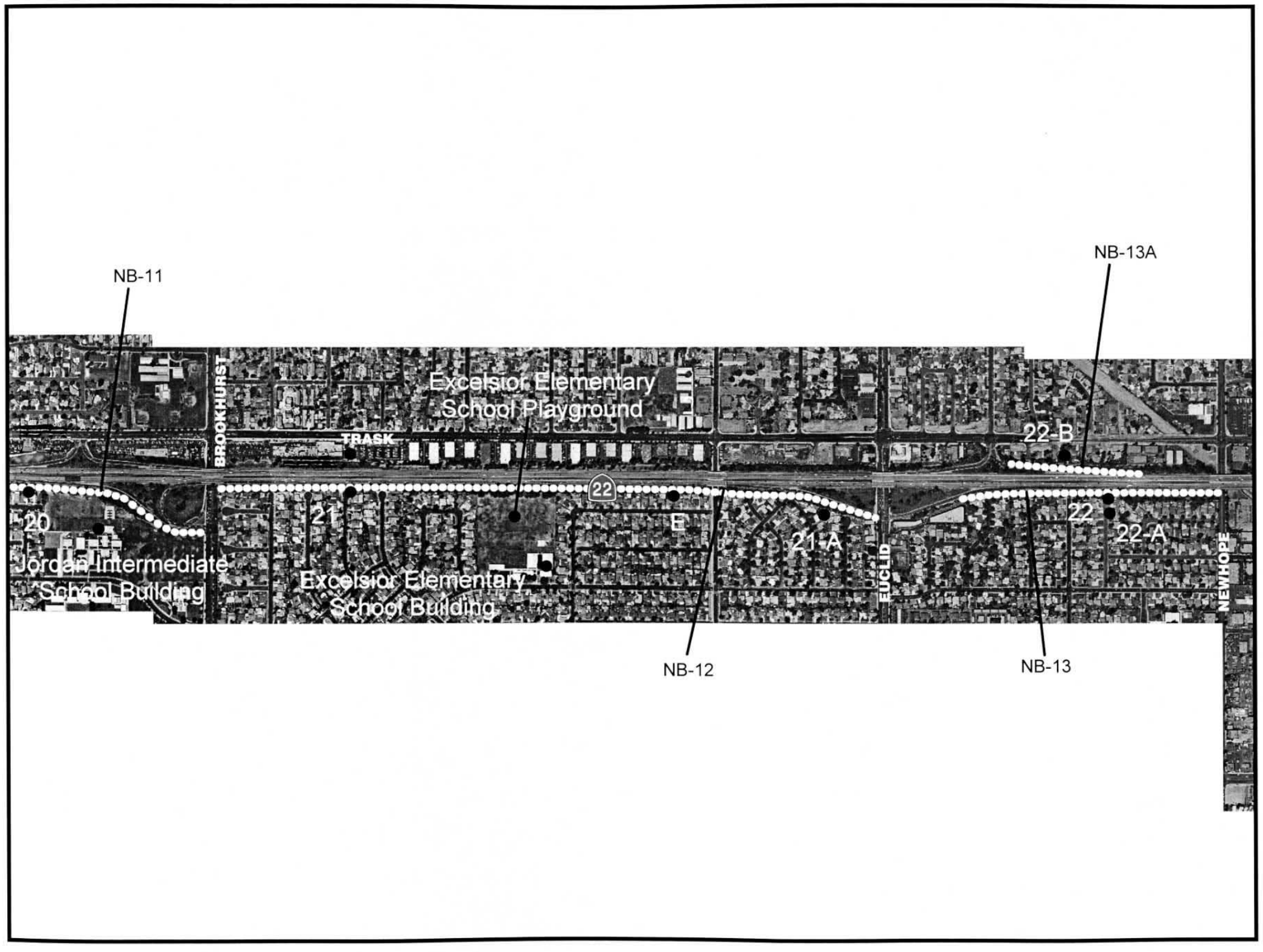
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1E



SR-22/West Orange County Connection Project

Proposed Noise Barriers (Enhaced) Reduced Build Alternative

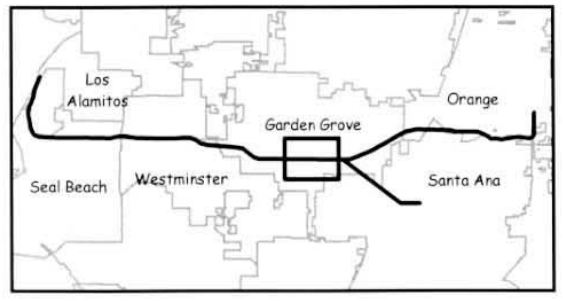
LEGEND

- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision*.

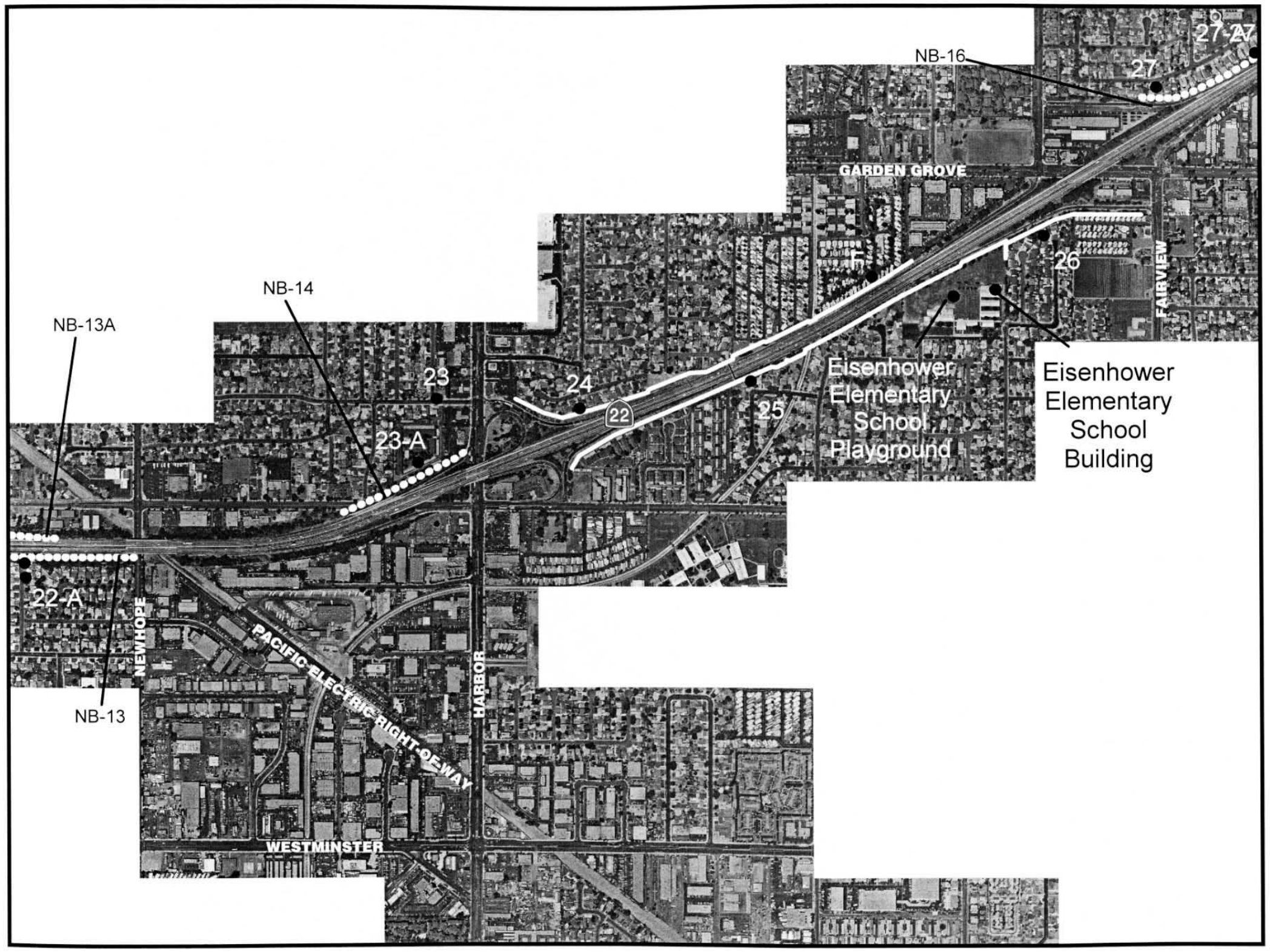
Note: Noise barrier locations are approximate only.



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1F



SR-22/West Orange County Connection Project

Proposed Noise Barriers
(Enhanced) Reduced Build Alternative

LEGEND

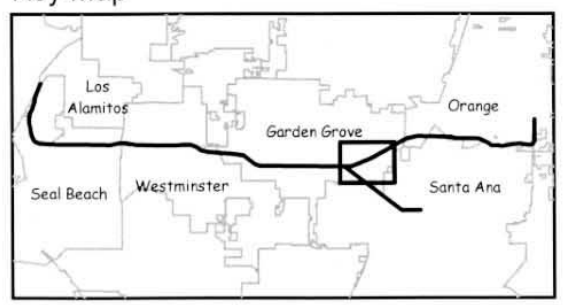
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photography: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

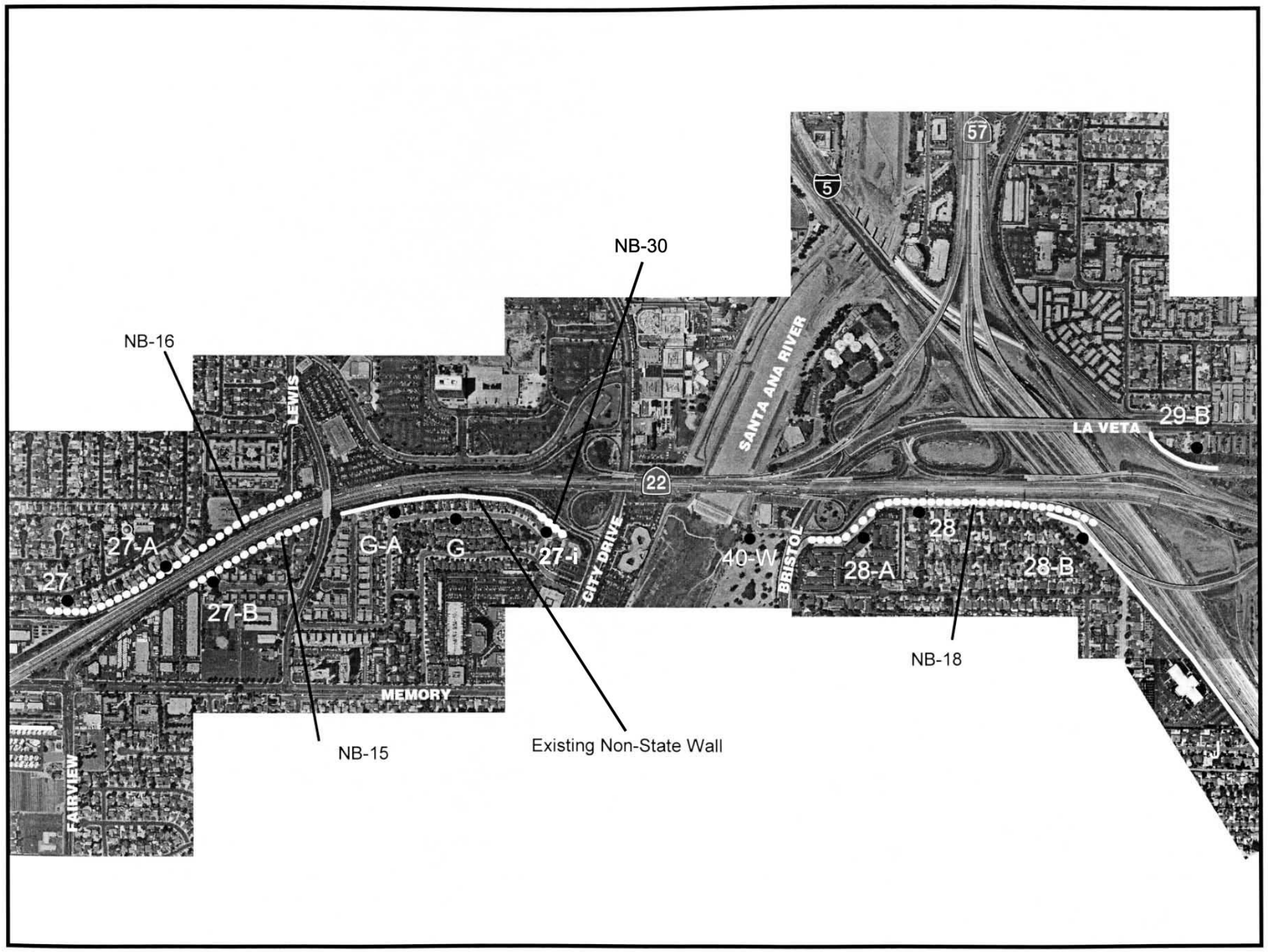
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1G



SR-22/West Orange County Connection Project

Proposed Noise Barriers
(Enhanced) Reduced Build Alternative

LEGEND

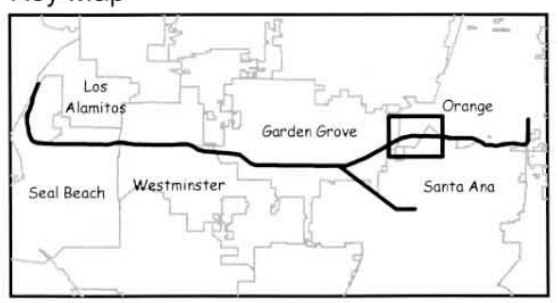
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

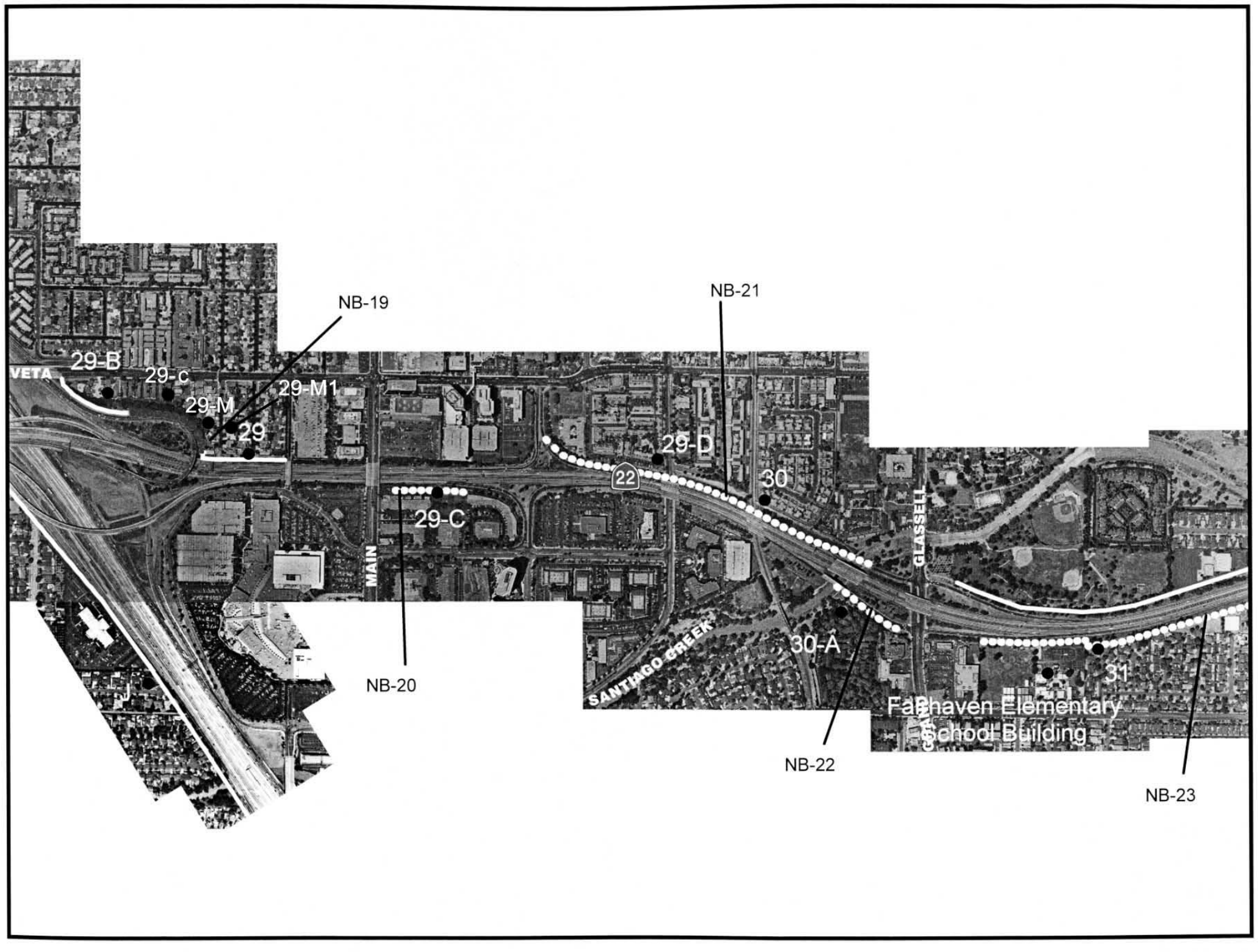
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1H



SR-22/West Orange County Connection Project

Proposed Noise Barriers (Enhanced) Reduced Build Alternative

LEGEND

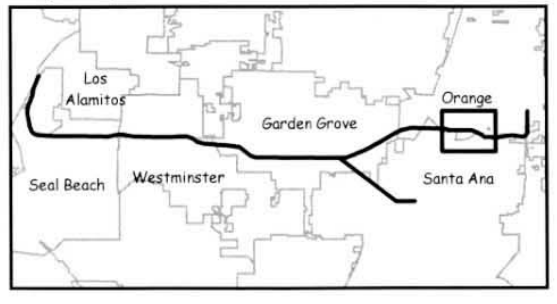
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

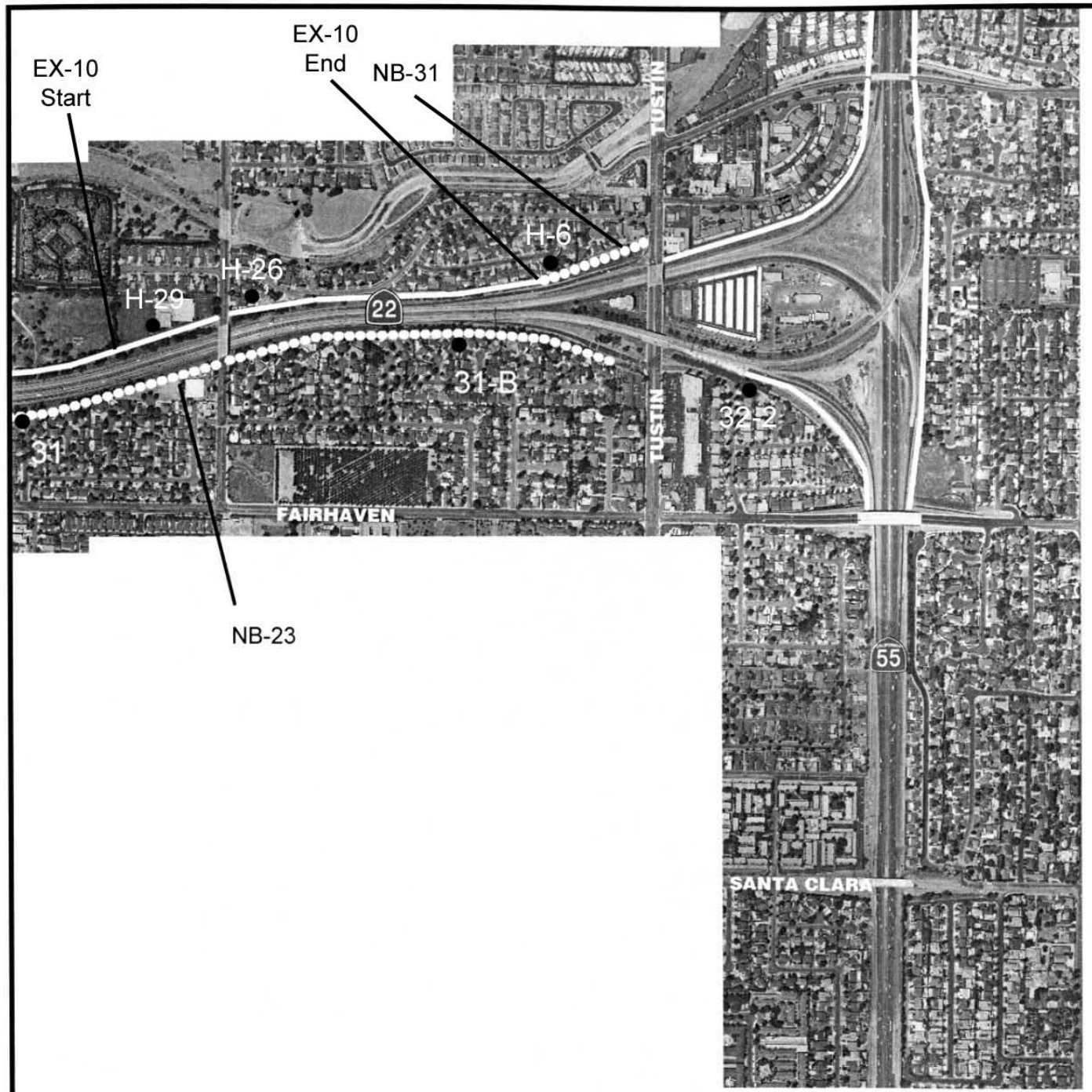
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1 I



SR-22/West Orange County Connection Project

Proposed Noise Barriers
(Enhanced) Reduced Build Alternative

LEGEND

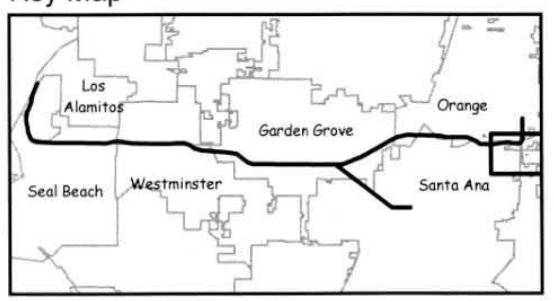
- Noise Measurement and/or Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

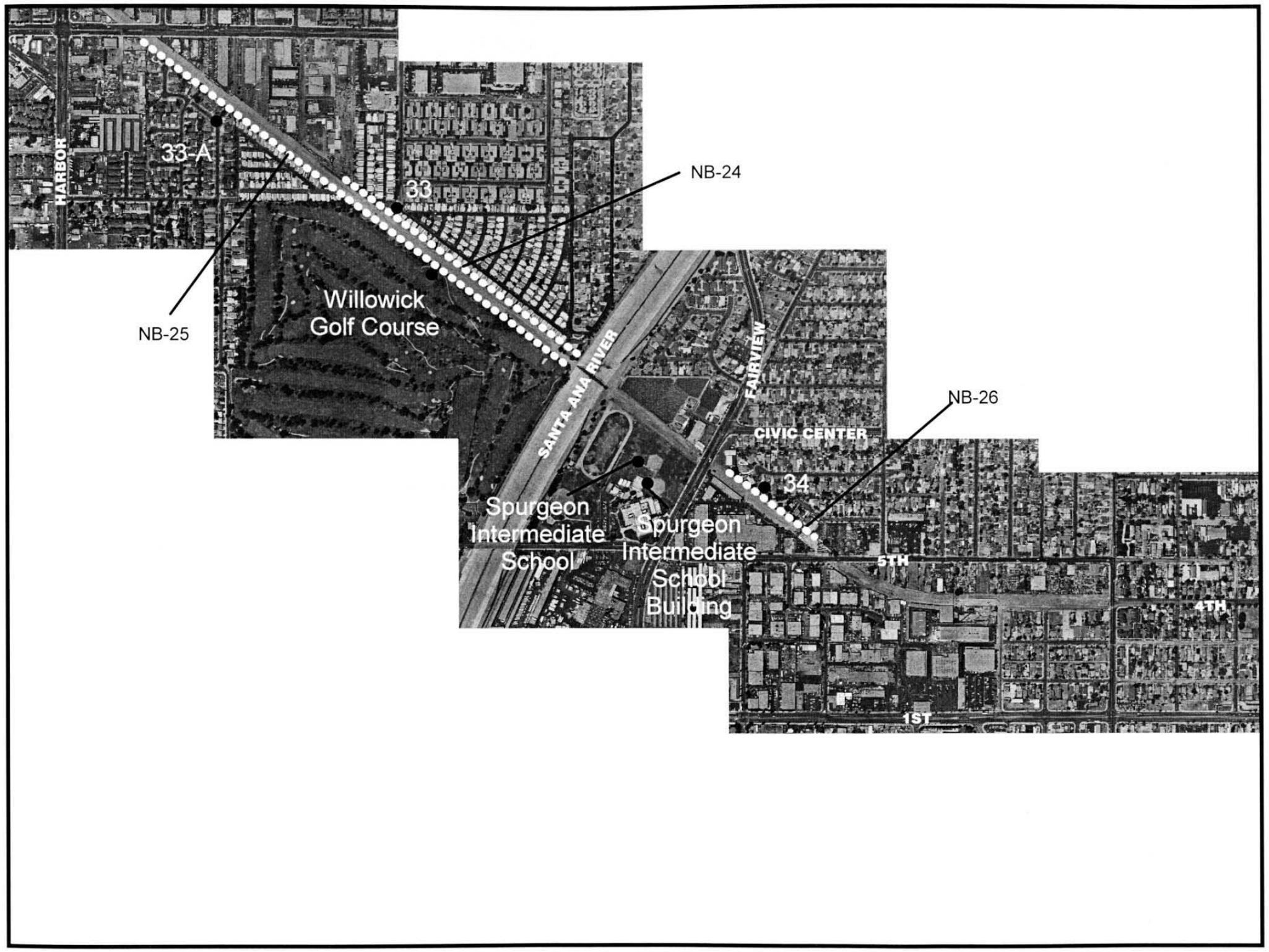
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-1J



SR-22/West Orange County Connection Project

Proposed Noise Barriers Full Build Alternative

LEGEND

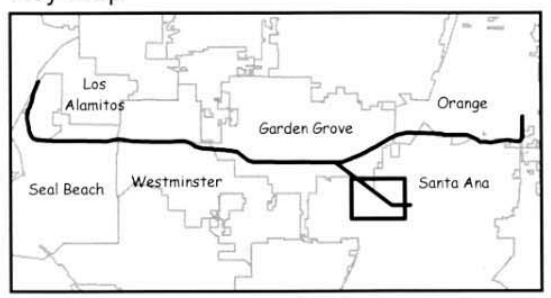
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

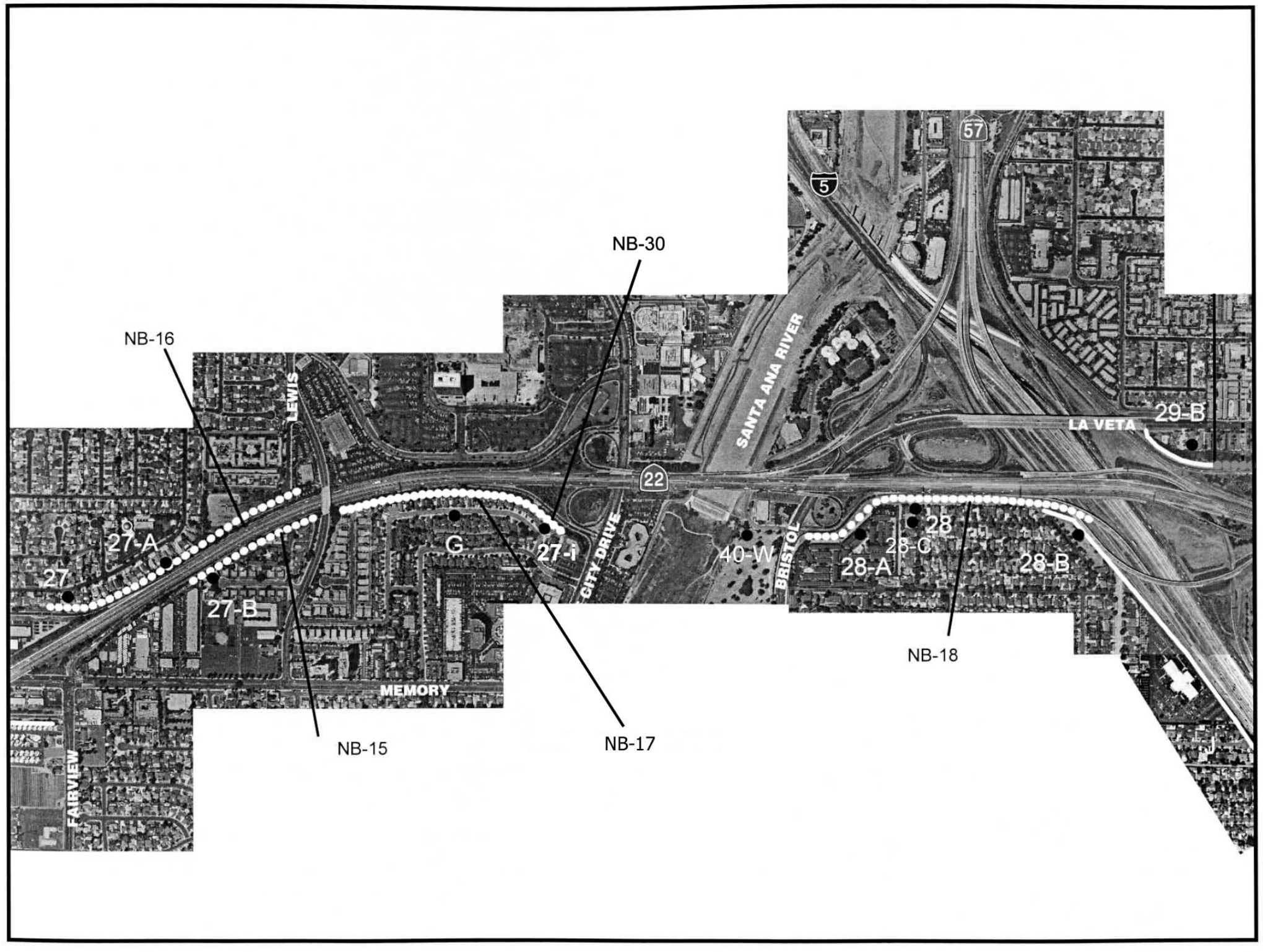
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-2A



SR-22/West Orange County Connection Project

Proposed Noise Barriers
Full Build Alternative

LEGEND

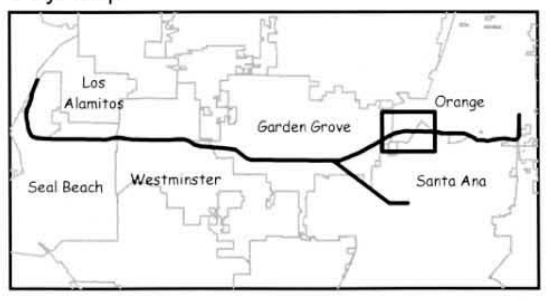
- Noise Measurement and/or Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

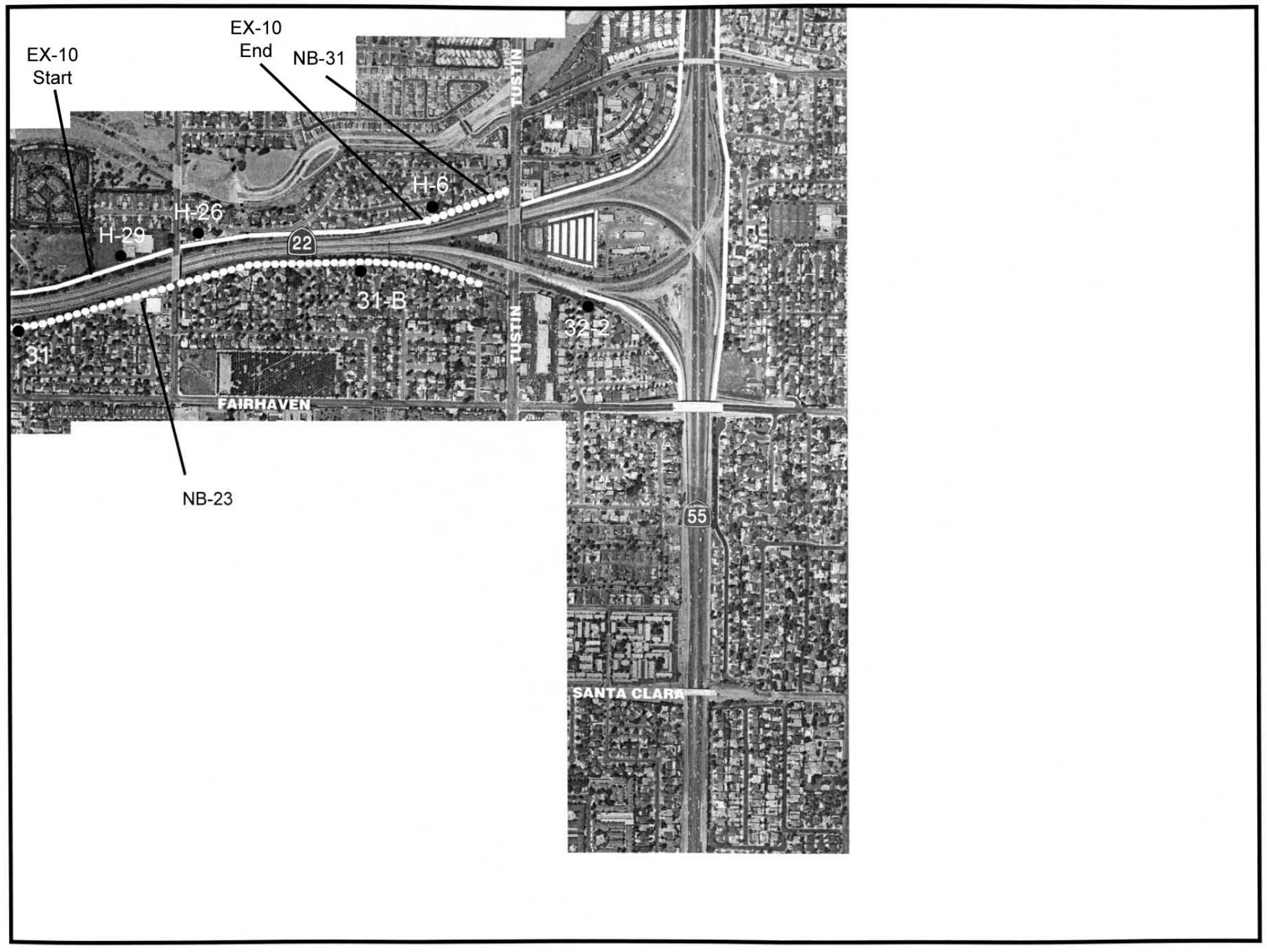
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-2B



SR-22/West Orange County Connection Project

Proposed Noise Barriers Full Build Alternative

LEGEND

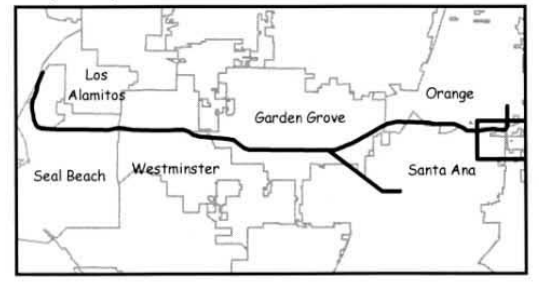
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

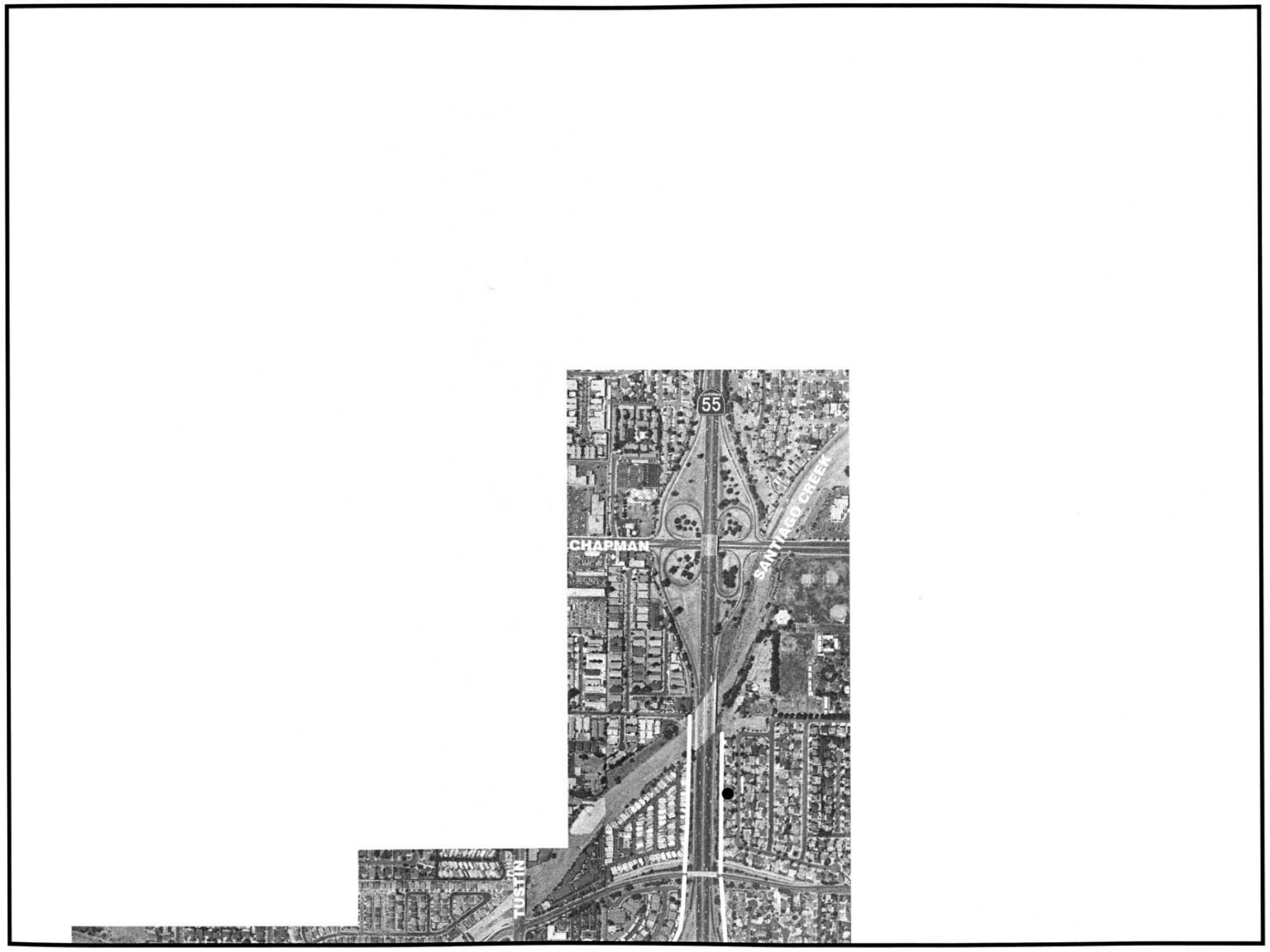
Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-2C



SR-22/West Orange County Connection Project

Proposed Noise Barriers Full Build Alternative

LEGEND

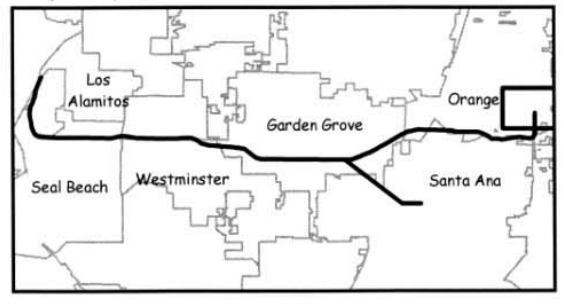
- Noise Measurement and Modeling Sites
- Existing Noise Barriers
- Proposed Noise Barriers*

Source: Orthographic Photograpy: Landata Airborne Systems, Inc. January, 1997.

*Based on *Preliminary Noise Abatement Decision.*

Note: Noise barrier locations are approximate only.

Key Map



0.1 0 0.1 0.2 Miles

0.1 0 0.1 0.2 Kilometers

Figure 4.9-2D